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Other Contributor(s)	University of Hong Kong
Author(s)	Tang, Wing-kwan; 鄧泳君
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THE UNIVERSITY OF HONG KONG

AN EMPIRICAL STUDY OF THE RELATIONSHIP BETWEEN PROPERTY PRICES AND SPECULATIVE ACTIVITIES IN HONG KONG'S RESIDNETIAL MARKETS

A DISSERTATION SUBMITTEDD TO
THE FACULTY OF ARCHITECTURE
IN CANDIDACY FOR THE DEGREE OF
BACHELOR OF SCIENCE IN SURVEYING

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BY

TANG WING KWAN

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Declaration

I declare that this dissertation represents my own work, except where due acknowledgment is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualification.

Signed: _____

Name: _____

Date: _____

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ABSTRACT

This dissertation investigates the relationship between property prices and speculative activities in Hong Kong's residential markets. The relationship between speculation and housing prices attracted many researchers but so far there has been no conclusive result. Some hold the view that speculative activities stimulate property prices. On the other hand, some believe that speculative activities are the driven by increased demand that translate into increase in property prices, and thus they conclude that property prices lead speculative activities. Mil (1921) supports the idea that speculative activities induce property prices, Pozdena (1989) has characterized rapid rise in housing prices as a manifestation of a speculative boom and Tse, Ho and Ganesan (1997) found that house prices in Hong Kong are sensitive to changes in speculative activities. However, in recently years, Ho and Kwong (2002) and Ho (2000) provide a completely contradictory result (using relatively short time series) by claiming that property prices lead speculative activities, but not the vice versa and thus refuted the hypothesis that speculative activities drive property prices.

Since there are contrasting views and results on the relationship between property prices and speculative activities, it is worthwhile to carry out an empirical study on the relationship between property prices and speculative activities with more reliable data that are available in Hong Kong.

The higher-priced homes and lowered priced homes may behave differently as they are driven by slightly different sets of economic forces as claimed by Smith and Ho (1996). In this study, apart from investigating the lead-lag relationship between

overall residential property prices and speculative activities, the relationship between property prices and speculative activities in the mass and luxury private residential property sub-markets will also be investigated independently.

Quantifying speculation has been one of the major difficulties in testing the relationship between speculation and property prices. In this study, the ratio of number of confirmor transactions to total number of transactions has been taken as a proxy for the intensity of speculation since confirmor transactions must be speculative in nature. Time series of this ratio is found to be stationary of degree one I(1).

Monthly property price data series can be are obtained from the Rating and Valuation Department for the period 1993 to 2004. Both the price series for the mass residential sub-market and that for the luxury sub-market are I(1). Results of the Granger causality tests suggest that market wide overall residential property prices lead speculative activities, but not the vice versa. These results suggest that, speculation is unlikely to drive residential price up. Results for the sub-market analysis show that the mass private residential property prices "Granger caused" speculation, while no lead-lag relationship is found between property prices and speculative activities in the luxury sub-market.

There is no evidence that speculators are to be blamed for fuelling property prices. In fact, it was the changes in fundamentals (external shocks) that induce speculators to enter the market. Since property is an incomplete market (no short-selling), all speculators must be bullish and thus may be see to be colluding to maintain prices. Since information cost is relatively high and dominated by end users,

who are usually non frequent trading and possess fewer information than speculators, therefore, there is room for a professional speculator to earn a profit.

This study also confirms that the 1994 anti-speculation measures adopted by the Hong Kong government were fundamentally wrong. Subsequent property movements after 1994 also gave very strong support to the hypothesis that speculation is not a contributor to property price increase. The results in the study should have policy important implications for policy makers of cities/counties such as Shanghai, Hangzhou, Beijing and Hong Kong, many of which experienced significant increase in residential prices over the last 18 months. Not only that anti-speculation cannot cool down the surging property price, in longer term, they are likely to lead to an increase in volatility due to increased transaction costs and decline the volume of transaction and market information.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter 1 Introduction

1.1 Background

Hong Kong is a small place, with total area of only 1102.56 square kilometres[1], accommodating with more than seven million people. And 84% of the land in Hong Kong is too hilly for real estate development. Due to the limited supply of land, the real estate sector plays an important role in the economy of Hong Kong. The real estate sector and the construction industry contribute to more than 20% of Hong Kong's GDP. Moreover, more than one third of total government expenditure is real estate related. Besides, the total revenue of the government is about 20% in average for the past ten years. The real estate market is an aggregate made up of the residential, industrial, office and retail sectors. Among these sectors, residential properties play the most significant role in the Hong Kong real estate market.

Residential properties possess dual properties, as an investment and a necessity. The duality of consumption and investment aspects of housing demand distinguishes it from other durable goods (Henderson & Ioannides, 1983). The weighting for purchasing residential properties for consumption and investment purpose vary among purchasers from purely consumption purpose, as an end-user of the flat who remain as an owner-occupant for decades, to short term investment motive, as a speculator who motivated solely by perceived capital gains but without any consumption intention. Property speculative activities are defined by Kaldor (1939) as the buying and selling of properties under uncertainty by the speculators who solely motivated by the capital gains derived from the property through

[1] The Lands Department February 2004

anticipated favorable price change in the property market. Speculative activities will only take place if there is uncertainty about future price movements. This is the uncertainty that stimulates the speculators who consider themselves able to perceive the future price trends. Hence, they will attempt to transform their expectations into capital gains.

Generally in Hong Kong, people consider property investment is more superior to other traditional investment instruments like equities as property investment can act as a tool for hedge against the inflation and at the same time with attractive rate of return under relatively lower risk. Many studies have even concluded that direct property investment has better risk and return trade-off than stocks and many other investment instruments. (Norman, Sirmans and Benjamin, (1995); Webb (1990); Howells and Rydin (1990) and Hamilton and Wood (1991)

The unique economy characteristics in Hong Kong also initiated speculators take part in the residential market. The attractive rate of return is further amplified by leverage as house purchases are usually assisted by obtaining mortgage from banks. In Hong Kong, the banks offered with high mortgage ceiling which range from 70% to 90% of the transacted prices. Moreover, the banks also allow the purchasers' mortgage payment sometimes as high as 50% of their monthly income. In addition, the low rate of interest rates in early 1990s also made property properties to be good hedge against inflation. Unlike other countries, there is no property tax imposed by the Hong Kong government. About all, the economy features in Hong Kong favours for the property investment.

The speculative activities in the private residential housing market in Hong Kong are under great concern since many research papers have shown that speculative activities are the result of price fluctuation. Moreover, some researchers observe positive correlations exist between property prices and speculative activities, which lead many to believe that speculative activities are the prime cause behind property prices increases as speculative activities add pressure to property demand and, through hoarding, reduce the number of flats directly available to home buyers, thereby pushing up the properties prices. Raddel (1999) concluded that feedback trading not only results in housing market housing market speculative bubbles, but also exaggerates price volatility.

On the contrary, there are arguments recently claiming that it is the property price movements that induce speculative activities but not the vice versa. It is the consequence of property price changes that follow fundamental changes in supple and demand conditions. The supporting reason for this argument is the unintentional behaviour of the purchasers on speculating. That means the initial intention of the purchasers is for consumption purpose instead of investment purpose. It is the unanticipated changes in property price in the residential market accounts for the reselling of the property to the market by the purchasers before the completion date of the transaction. (Ho 2000)

The relationship between speculation and housing prices attracted many researchers but so far there has been no conclusive result. Some hold the view that speculative activities lead property prices. On the other hand, some believe that property prices lead speculative activities. Therefore, the main goal of this study is to

study the long-run lead-lag relationship between property prices and speculative activities in Hong Kong's residential markets with more reliable data that are available in Hong Kong.

1.2 Objectives

In order to achieve the goal of the study, several objectives are derived and they are as follows:

1. To delineate the definitions and scope of speculative activities in the private property market
2. To account for the reasons for the speculative activities in private residential property market in Hong Kong
3. To analyze the characteristics of different types of private residential property markets in Hong Kong
4. To study the lead-lag relationship between property prices and speculative activities in private residential property market in Hong Kong
5. To examine and evaluate the government's anti-speculation policies

1.3 Structure of the Study

This dissertation is divided into 11 Chapters. Chapter 1 will be the introduction which gives the background, objectives and general organization of the dissertation.

Chapter 2 will be the review of literature about real estate prices, speculative

activities and the relationship between property prices and speculative activities. A comprehensive review of literature on speculative activities will help delineate the definitions and scope of speculative activities in the private property market.

Chapter 3 will be the development of the hypotheses, the hypotheses and the expected results in this study.

Chapter 4 will provide the overview of the real estate market in Hong Kong by investigating the unique characteristics of Hong Kong's residential markets and the volatility of private residential property prices with the uniqueness of Hong Kong environment.

Chapter 5 will provide the evidence of speculation in Hong Kong's residential markets and will follow by discussing the factors contributing to speculative activities.

Chapter 6 will focus on the statistical methodology. The methods employed in this study are Augmented Dicker-Fuller unit root tests and Granger causality tests. Augmented Dicker-fuller Unit root tests are used to establish the stationary of the data while Granger causality tests are employed to establish the long term lead-lag relationship between property prices and speculative activities in private residential property market in Hong Kong.

Chapter 7 will give an account of the data and the sources used in this study for the analysis of the relationship between property prices and speculative activities in

Hong Kong's residential markets. The nominal residential property price index will be used as a measure of the property prices while the ratio of number of confirmor transactions to total number of transactions has been taken as a proxy for the intensity of speculative activities.

Chapter 8 and 9 will present the empirical results and discuss the results of lead-lag relationship between property prices and speculative activities in Hong Kong's residential markets found by Augmented Dicker-fuller unit root tests and Granger causality tests.

Chapter 10 will bring about the implications of the study which related to the policy implications for the Hong Kong's residential markets.

Chapter 11 will be the conclusion chapter. It will summarize the work and try to point out some limitations of this study which further study should be reminded of.

Chapter 2 Literature Review

In this chapter, relevant literature and pervious researches or studies will be summarized and discussed. Firstly, it is about the literature review on the real estate prices, followed by the literature review on speculative activities. Then, the literature review will be focused on the relationship between property prices and speculative activities.

2.1 Real Estate Prices

2.1.1 Volatility of Real Estate Prices

The property markets in Hong Kong and elsewhere are characterized by significant boom and bust cycles. These boom and bust cycles make the real estate prices highly volatile. (Wong, Chau and Lai, 1996) This issue has been well documented in the international forum as it creates much impact to the economy. Many researches have been done about the volatility of real estate prices, not only on the volatility on land prices but also on property prices. In the following, relevant literature on the evidence, the nature, the causes and the effect of the volatility of real estate prices will be reviewed.

2.1.1.1 Evidence of Volatility

Clayton (1996) claims that in recent years, many local housing markets in North America have undergone boom and bust cycles. These episodes are characterized by

dramatic house price fluctuations over relatively short periods of time. As a description of the market for residential property, Bryan and Colwell (1980) state: "It is a mistake to imagine that housing prices move upward without interruption. On the surface, it may appear that housing prices have exhibited such behaviour; however, there may be hidden cyclical and seasonal fluctuations. Over the past several decades, the tendency, as reflected in U.S. price data, had been for new home prices to rise. However, substantial deviations from this tendency have occurred." Birch and Sunderman (2003) claim the price of a property often changes over short time periods, sometimes in unpredictable ways.

Apart from the researches conducted in foreign countries, there are studies conducted in Hong Kong as well about the volatility of real estate prices. Wong, Chau and Lai (1996) state Hong Kong real estate market has experienced many significant prosperous and miserable cycles which attribute to the nature of high volatility. “One of the key features of property and construction cycles in Hong Kong is their high volatility. Quarterly gross domestic product figures for the period between 1973 and 1993 show that investments in property and construction were 2.8 times more volatile than gross domestic product[2].”

2.1.1.2 Nature of Volatility

Wong, Chau and Lai (1996) claim property prices are by nature volatile and fluctuation of property prices is an inherent feature of property development. Property developments are forward-looking decision based on expectations about market

[2] Volatility is measures as the variance in annual growth rates

conditions in the future. Given the long construction lags, any errors in marking market forecasts will lead to considerable volatility in market prices and subsequent housing investments and such fluctuations are part of the market adjustment process. With long building cycles that are highly sensitive to market uncertainties, one would expect price volatility to be the rule and cyclical vacancy rates to be an inherent feature of the market adjustment process. Attempts to smooth these fluctuations through government interventions would only result in a less efficient property market by prolonging the adjustment process and lead to more severe booms and busts. Bryan and Colwell (1980) state housing prices move through time based on secular trends, cyclical, seasonal and other measurable effects. In addition, the observed time series will always contain the impact of a large number of random forces. By definition, each of these random forces has too small an impact on any time series to be separately explained. But the combined effect of these forces can be measured. This combined effect is characterized by the random nature of its impact over time. Therefore, a time series of price movements is viewing as a combination of explicable and inexplicable forces.

2.1.1.3 Causes for Volatility

Obviously, price volatility is affected by a large array of variables from demand side and supply side. Kwong and Leung (2000) claim that the durable nature of real property, long production lag, fluctuating demand, and supply of credits are the factors which contributing to the volatility of property prices.

Tse, Ho and Ganesan (1999) analyze the determinants of house prices and investment demand for residential property by developing a reduced-form equilibrium model to explain changes in house prices in Hong Kong. The result found that Hong Kong's residential property market is based on a price adjustment process. If new construction were based mainly on housing demand, house prices will be very volatile due to the fluctuation of investment demand. Housing demand is not the same as investment demand for residential property. Housing demand refers to the take-up figures in respect of flats which represent the net increase in the number of units occupied. However, the investment demand in any period is the sum of housing demand and the demand generated by the need for investments. The investment demand, in contrast to housing demand, includes those with enough purchasing power to occupy available housing units as well as those desires to buy a house for renting or price appreciation. Therefore they suggest that new construction could partly account for investment demand with a view to smoothing the fluctuation in house prices due to the very volatile investment demand in the housing market.

2.1.1.4 Effect of Volatility

Case (1991) argues that much of the recent decline in economy of the Northeast United States can be traced back to the housing and land price booms of 1984-1987. These booms lead to dramatic changes in the distribution of income (Case and Cook, 1989).

2.1.2 Fundemental Factors Affecting Property Prices

During the early 1980s and 1990s, Hong Kong property prices were appreciating rapidly which have pushed homeownership beyond the reach of many aspiring households. There are lots of researches and studies done to find out the fundamental factors which affect the property prices significantly.

Since late 1980s, relationship between inflation and proprety market performance has always been a controversial topic. Limmarck and Ward (1988) believe property provides a partial hedge against inflation. Pyhrr, et al. (1989) link the inflation cycle to the real estate cycle and illustrate the infltion hedging properties of real estate. In Hong Kong, economic reports[3] produced by Hong Kong Bank illustate that the increase of property prices in Hong Kong from 1990 is due to the enhanced inflation expectation at which investors attempted to hedge agianst.

Case and Shiller (1990) identify factors which affect housing market. They conclude that construction cost, income growth and population are highly relevant to property prices. The population effect is also agreed by Reichert (1990), he points out that population growth puts direct pressure on the demand for housing services, especially if the population growth mainly stem from the home-buying age group with significant income. Potepan (1994) finds out a higher level of current population growth tends to raise current housing price through the expectation that higher further population levels will cause higher further housing prices. Clapp and Giaccotto (1994) claim that housing price changes respond negatively to contemporaneous real interest rate and to expected inflation because increase in the discount rate reduce asset price. Unexpected inflation increase house prices, as it should if implicit rental income

[3] Hong Kong Bank, *Economic Report,* May, 1991 and April, 1994

increases while the discount rate is constant. Unemployment also has a negative influence on housing prices; higher priced areas are more sensitive to unemployment. Tse, Ho and Ganesan (1997) found that house prices are sensitive to changes in speculation, population growth and real rate of interest. Kan, Kwong and Leung (2004) state that property prices are intimately related to macroeconomic variables. In particular, property prices are positively correlated with real output growth.

When investigating the fundamental factors which affect property prices, some researches categorized the factors into demand side and supply side, claiming that demand and supply of the housing units are important determinants of house prices. DiPasquale and Wheaton (1994) break down the variables in demand side and supply side and Mankiw and Weil (1989) state that housing demand is negatively related to real house price and positively related to an age-related demand factor, and supply is simply positively related to real house price. They believe price adjust on demand side when consumer develop expectations by looking backward at historic price movement, and on supply side price of new units increases as stock grows because usable land become more scarce. Chou and Shih (1995) also report on the housing market in terms of supply and demand by illustrating that scarcity of land and the government's inefficient allocation of land causes insufficient supply. On the other hand, political event, affordability and real interest rates explain the demand side factors. The negative real interest rate since mid-1989 that increases the demand for investment, either in the form of speculation or long-term investment, exerts further pressure to the upswing prices of the property market in Hong Kong. Quigley (1999) investigates the effects upon supplier and demander behaviour of differing price expectations in the real estate market. They get the linkages between economic fundamentals and

property prices. In particular, changes in employment, income, number of households and number of construction permits are important determinants of housing prices.

Paloma Taltavull *(*2003) points out that the expansion of cities and urban areas affects the residential market prices in Spanish cities. The analysis is focused on the links between housing demand in the cities and housing prices as a result of the process of growth and attraction of new population to the area. The results provided evidence about the relationship existing between population, economic structure, waged earning and residential prices. Existing units' prices not only depend on population, but also construction activity so that an increase in house-building increases housing supply in the market making existing prices fall or be maintained in nominal terms.

Back to the situation in Hong Kong, Wong, Chau and Lai (1996) argue that rising property prices in the 1990s can be well explained by changes in the underlying factors that affect the demand for and supply of residential housing units. An econometric models was used to show that property price increases in the early 1990s is a result of a confluence of facilitating factors, including 1) falling real mortgage interest rates, 2) rising economic prosperity, 3) slow growth of the stock of private housing stock, 4) slow growth of the stock of public housing stock, 5) falling average household size, and 6) favourable demographic factors arising from net inward immigration and the formation of new households. Among the above six factors, Wong, Chau and Lai identify only the stocks of private housing is within the control of government policy as being important in determining property prices while the others are basically beyond the control of the government. Peng and Wheaton (1994)

analyze the mechanism by which changes in the supply of developable land affect housing prices and housing output. The analysis is based on Hong Kong, a city-state where the supply of new land is under strict government control, providing a unique situation for studying the impact of supply restrictions. The result found that the supply restriction in Hong Kong has caused higher housing prices but lower housing output.

2.2 Speculative Activities

Speculation is a very frequent term used over many commodity markets, particular in real estate market. In this part, the concept, types, cause and functions of speculative activities will be introduced.

2.2.1 Concept of Speculation

The classic definition of speculation focuses on the intention of the speculators. Emery (1896) has the perception as such “speculation consists in buying and selling commodities, or securities or other property, in the hope of a profit from anticipated changes of value. Speculation is the attempt to make money out of fluctuations in the value of property. Emery (1969) further claim speculation is a transaction in which one acquires by purchasing the right to a certain property, and gains for himself the difference between the value of the property at the time of the sale and its value at the time of purchase. Pyhrr (1989), property speculation is regarded as property purchased for the sole purpose of realizing a profit upon sale. Generally, no additional

capital is invested in the property following the acquisition, and any income produced during the holding period is incidental to the measurement of profits.

What makes Speculation distinguish from others not only is the intention of the speculators, but also the uncertainty about the future price movements. Kaldor (1939) characterized speculative sales or purchases as those motivated solely by perceived capital gains. The motive of the purchasers is solely on the capital gains which involve buying and selling goods under uncertainty, and expects to resell or repurchase after an anticipated price. Binswanger (1999) considers all transactions as speculative activities, if the only aim is to acquire any goods for selling at a later time at an anticipated higher price due to an anticipated change in the market value. Speculative activities will only take place if there is uncertainty about future price movements. This is the uncertainty that stimulates the speculators who consider themselves able to perceive the future price trends. Hence, they will attempt to transform their expectations into capital gains. Pure price speculation involves buying of selling in the expectation of a future price change. If the direction of price change is correctly anticipated, the process of speculation allows for profitable resale or repurchase in the same market (Levin and Wright, 1997). In other words, a speculative trader sells or buys goods under uncertainty, with the intent to resell or repurchase them after some anticipated favorable price change.

However, there is always an ambiguity to differentiate between speculation and investment since both of them are motivating by perceived capital gains under uncertainty. Some scholars employ the time basis to determine whether it is speculation or investment. If the return on capital is expected in a long run, it is more

likely to be investment. Harrison and Kreps (1978) consider investment as a long-term investment, but speculation as a short-term one. And if there is any guidelines agreed on a certain period of holding time, they belong to investment, if not, they belong to speculation. Plattner (1988) also makes a comparison for speculator and investors and states that "an investor is one who owns property for the purpose of obtaining a long-term stream of benefits, i.e. income, from the appropriate use of property. A speculator is one who acquires property and, if necessary, converts it into a better use, and then sells it for a gain. A speculator makes a short-term investment, assumes a risk, and makes a profit or incurs a loss." However, it seems practically difficult to justify the length of holding period as long or short in view of the ever changing expectations on the economic performance by the market. As a result, it may not justifiable to identify speculators by simply "long-term" or "short-term" investment that they are undertaking. This may only give some indications regarding the conceptual definition of speculation.

Radcliff (1990) points out the difference between the speculative activities and the normal investment activities in the real estate market and considers that "Speculative real estate might be regarded as property purchased for the sole purpose or realizing a profit upon resale. Generally, no additional capital is invested in the property following the acquisition, and any income produced during the holding period is incidental to the measurement of profit, in contrast to speculative real estate, investment real estate may be defined as a property that produces, or is capable of producing, periodic revenue from it operation and ownership as part of the total return." According to Pyhrr *et al.* (1989), a better approach to determine whether a person is speculating or investing would be to consider the nature and degree of the

analysis performed. It can be argued that investor who makes purchase decisions on the basis of hunch, instinct, or intuition is performing an act of speculation, while investor who explicitly attempts to measure the return and risk parameters of a project and who bases the purchase decision on this analysis is performing an act of investment, even if the expected returns and risks are high.

2.2.2 Types of Speculation

Wong, Chau and Lai (1996) claim in reality there can be two types of speculative activities. The first type is a consequence of property price increases that follow fundamental changes in supply and demand conditions. The second type is not based on fundamentals and can lead to property price increases that are pure speculative bubbles. Wong, Chau and Lai (1996) state clearly that it is important to draw a sharp distinction between these two types of speculation, even though it may not be easy to distinguish between them in reality.

2.2.2.1 Definition of Bubbles

Flood and Garber (1980), Blanchard (1979), and Tirole (1985) all define the bubble as what is left over after market fundamentals have been removed from the price. Flood and Garber (1980) state a bubble arise when the actual market price depends positively on its own expected rate of change, as normally occurs in asset markets. The positive relationship between price and its expected rate of change implies a similar relationship between price and its actual rate of change. In such conditions, the arbitrary, self-fulfilling expectation of price changes may drive the

actual price changes independently of *market fundamentals;* we refer to such a situation as *a price bubble*. That means, if price-level bubbles occur, they are associated with self-fulfilling expectations. Flood and Hodrick (1990) claim if bubbles exist in an asset markets, market prices of assets will differ from their fundamental values.

2.2.3 Cause for Speculation

Uncertainty about the future price movements is the drive for speculation that makes traders able to gain profit from the fluctuation of the market. Working (1953)[4] explains the key to speculative trading is based on various expectations that depend on different forecasts of future price movements.

2.2.4 Functions of Speculation

From an economic point of view, Wong, Chau and Lai (1996) argue that speculation is economically desirable, except for the bubbles case. Since speculators are the middleman who perform the important function of spreading risks, which would otherwise have to be borne by the producers and consumers. It can occur only when there are differences among people in their attitudes toward risk and their assessment of further prospects.

Wong (1993) also claims speculation plays a positive role in diversifying risk. The property agents and speculators will help space out the sale of units to final users. Therefore, the risk of picking the right time to sell the right number of units has been

[4] *Speculation and Divergent Information: Improving Efficiency*

partly to property agents and speculators in view of this idea, speculation results in the transfer of risk from agents with high risk aversion, or who are unable to diversify their positions, to agents with low risk aversion, or who can more easily diversify their positions. The former group is identified as "hedgers" and the latter as "speculators" (Ghosh, Gilbert and Hallett, 1987). Keynes (1930) and Hicks (1946) state for the risk-averse agents who want to get rid of risky positions (the hedgers), the speculative market functions as an insurance against price risk and they are wiling to pay a risk premium to those who, due to their low risk aversion (the speculators), are prone to take risky positions.

Apart from the diversification of risk, some economists claim that speculation tend to stabilize market prices as speculators are buying low and selling high, while others argue that speculators can earn profits and simultaneously destabilize markets. When speculation is labeled destabilizing that usually means the price fluctuations are reinforced by speculative trading, but if the function of speculation were stabilizing, the price fluctuations are dampened. Kaldor (1939) distinguishes between speculators and non-speculating market participants and finds that the extent of destabilizing is depended on number of speculative players in the market. If there are many speculators, it tends to be destabilizing as speculators also start to take the behaviour of other speculators into account and incorporate them into their price expectations. Hart and Kreps (1986) argues that speculation, in general, destabilizes prices and *"it takes extremely strong conditions would speculative activity stabilize prices even in a very weak sense"*. On the other hand, Friedman (1953) declares that speculation is intrinsically stabilizing. He further claims that profitable speculation indeed stabilizes

the market due to the fact that average speculators sell during the price above the equilibrium, on the contrary, buy when it is below the equilibrium.

2.3 Relationship between Property Prices and Speculative Activities

The previous are the literature reviews focused either on property prices or speculative activities. Many researches found that positive correlations do exist between property prices and speculative activities; therefore, the following will be the literatures which reveal the relationship between property prices and speculative activities in the property market in Hong Kong and foreign countries.

During 1990s, there had been growing concern about the dramatic rise of the residential property prices in Hong Kong. And during the same period of time, the number of speculative activities measured was also increasing dramatically. Therefore, speculative activities have been blamed for being the main cause for the surge of property prices.

Mill (1921) supports the idea that speculative activities induce property prices, in his *Principles of Political Economy*; he argues that speculative trading in fact would amplify the fluctuation in the financial market and speculative transactions are sometimes injurious to the public by heightening the fluctuations. Empirical evidence from Levin and Wright (1997) conclude that speculation was a determinant of house prices in the London and UK-wide housing market. Pozdena (1989) has characterized rapid rise in housing prices as a manifestation of a speculative boom or bubble. In other words, the prices are moving more rapidly than would be expected in the

housing's fundamental ability to provide income or services. Tse, Ho and Ganesan (1997) set up an econometric model of the housing prices in Hong Kong. They found that house prices in Hong Kong are sensitive to changes in speculation.

However, in recently years, more empirical researches have been carried out to find out the lead-lag relationship between property prices and speculative activities. It is interesting to find that these researches provide a completely contradictory result by claiming that property prices lead speculative activities but not the vice versa.

Ho (2000) and Ho and Kwong (2002) both use the Granger Causality Test in their studies to find out the lead-lag relationship between property prices and speculative activities in private residential property market.

Before using the Granger Causality Test, it is necessary to check if the time series data is stationary or not. Otherwise, the results of the causality test will be spurious. Many macroeconomic variables of Hong Kong have been non-stationary in the past decades (Hui and Yiu 2003). Therefore, a unit root test has been adopted to test for the stationary of all the variables. In general, the time series data is non-stationary in level term, especially for the macroeconomic data series, but the series will become stationary after taking the first difference of the data, i.e. $X = X_t - X_{t-1}$, with t means a particular time period.

Ho (2000) uses the Granger definition in bivariate context; he investigates the relationship between speculation and real estate prices in Hong Kong. Based on the methodology of Engle and Granger (1987), the purpose of his paper is to empirically

test for long-rum relationships between speculation and residential property prices, based on Hong Kong data during the period between June 1991 and May 1998. In his study, the residential property market is split into two different types of units to study, the mass residential units and luxury residential units. A vector correction model is used to estimate speculation. The error correction term is found to be statistically significant, implying Granger causality running from property prices to speculation in the mass residential property sub-market. The empirical findings provide evidence that fluctuations in residential property prices cause fluctuations in housing speculation in the mass residential property sub-market.

However, in Ho's (2000) paper, the actual number of confirmor[5] activities is used as the proxy of the speculative activity which makes the results doubtful in its convincingness. Moreover, only the mass residential property sub-market undergoes the vector error correction model. Therefore, in his study, no lead-lag relationship has been proven on the overall residential property market and the luxury residential property sub-market.

Ho and Kwong (2002) emphasize that the positive correlation between speculative activities and property price movements has confused many researchers and policy makers. They establish the direction of causal relationship between speculative activity and property price using the co-integration approach, error correction model, and the Granger-causality test. The long-run relationship between speculative activity and property price movements are tested by the co-integration analysis and short-run adjustment dynamics are estimated with the error correction

[5] A Confirmor is defined as a property that is resold after the sale and purchase agreement, but before the assignment This type of transaction involves quick resale with a view to reaping short-term capital gain

model (ECM) proposed in Engle and Granger (1987). Twenty-five major estates in Hong Kong are used as sample in their study and almost all units in their samples are smaller than 1076 square foot. Empirical results suggested that the property prices movement Granger-causes speculative activity, but not the reverse. But the results of this study only reflect the mass residential property sub-market.

2.4 Importance of Study

From the above studies, there are contrasting views and results on the relationship between property prices and speculative activities, it is worthwhile to carry out an empirical study on the relationship between property prices and speculative activities in the Hong Kong's residential markets.

The higher-priced homes and lowered priced homes may behave differently as they are driven by slightly different sets of economic forces as claimed by Smith and Ho (1996). Prices for houses at the upper end of the market are relatively more sensitive to variations in inflation because the strong impact inflation exerts on expected house price appreciation and real user costs for these homes. Prices for houses at the lower end of the market are relatively more sensitive to changes in interest rate, income and employment that affect cash flow costs and the affordability of homeownership, especially for first-time home buyer. Ho (2000) has intended to divide the entire private residential property market into mass and luxury sub-markets to study the lead-lag relationship between the property prices and speculative activities, but no empirical results are given for the luxury private residential property sub-market in his paper. In this study, apart from investigating the lead-lag

relationship between overall residential property prices and speculative activities, the relationship between property prices and speculative activities in the mass and luxury private residential property sub-markets will also be investigated independently. Results comparison between these two sub-markets will be made so as to find out the general attitude of the speculators to different sub-markets in terms of risk and return.

Chapter 3 Development of Hypotheses and Expected Results

3.1 Development of Hypotheses

The above contrasting views can be explained by different types of speculation involved as mentioned previously (Wong, Chau and Lai 1996). In reality there can be two types of speculative activities. The first type of speculation is a consequence of property price increases that follow fundamental changes in supply and demand conditions. This type of speculation will make property prices inducing speculation. In contrast, the second type is not based on fundamentals and can lead to property price increases that are pure speculative bubbles. This type of speculation will make speculation inducing property prices.

Moreover, Corgel and Deroos (2003) claim not all buyers and sellers are equal. Some buyers are better informed than others about the local economic conditions that affect property prices. Neither buyer nor seller has all the information about every property in the market that is necessary to set a perfect price for any single property. And Keynes (1973) in his *The General Theory* pointed out that there are two kinds of speculative players in the trading market. He distinguished those traders between uninformed amateur speculators and informed professional speculators. The informed professional speculators are the one with lots of first hand and insider effective information, theoretically, they most likely will profit from the capital gains of the market. In contrast, the uninformed amateur speculators do not have enough information to determine speculative strategies; they usually become the followers of the professional speculators. Therefore, informed professional speculators will

attempt to profit from uninformed amateur speculators by grasping the first hand information so that they can better predict the future equilibrium price. Then, they will participate into the market and change the current market price to their expected value price; in consequence, result in the phenomenon of speculative bubbles and rational bubbles, i.e. the second type of speculation with bubble determine the price which is different from the type of speculation performed by uninformed amateur speculators, i.e. the first type of speculation with market fundamentals determine the price.

In summary, there are two different types of speculation performed by different speculators in the market. The first type of speculation having market fundamentals determines the price and it is performed by uninformed amateur speculators which resulting in property prices inducing speculation. The second type of speculation having bubbles determines the price and it is performed by informed professional speculators which resulting in speculation inducing property prices.

Actually, these two types of speculation are not mutually exclusive which can be existed together simultaneously. The relationship between the property prices and speculative activities in property market depends on the *type and degree* of speculation participating in the market. The dominating type of speculation will reveal the lead-lag relationship between property prices and speculative activities. Feedback relationship will be resulted if both types of speculation participating actively in the property market while no lead-lag relationship will be found between property prices and speculative activities if the degree of speculation of the two types is not intense.

3.2 Hypotheses

Hypothesis 1: property prices lead speculative activities in overall private residential property market

Hypothesis 2: speculative activities lead property prices in overall private residential property market

Hypothesis 3: property prices lead speculative activities in mass private residential property sub-market

Hypothesis 4: speculative activities lead property prices in mass private residential property sub-market

Hypothesis 5: property prices lead speculative activities in luxury private residential property sub-market

Hypothesis 6: speculative activities lead property prices in luxury private residential property sub-market

3.3 Expected Results and Expected Empirical Implications of the Hypotheses

3.3.1 In Overall Private Residential Property Market (Hypothesis 1 and 2)

Hypothesis 1: property prices lead speculative activities in overall private residential property market

Hypothesis 2: speculative activities lead property prices in overall private residential property market

It is expected that *Hypothesis 1* will be accepted and *Hypothesis 2* will be rejected. That mean property prices should lead speculative activities in overall private residential property market but not the vice versa.

This implies that change of the property prices in overall private residential property market mainly follows the fundamental changes in supply and demand conditions but not the speculative bubbles, with property prices inducing speculative activities but not the vice versa.

The implication behind the expected results is most of the speculators in Hong Kong's residential markets are acting rationally. Speculative activities depend on the current market prices. Speculator will speculate when they realize that the price has deviated from what it should be.

3.3.2 In Mass Private Residential Property Sub-Market (Hypothesis 3 and 4)

Hypothesis 3: property prices lead speculative activities in mass private residential property sub-market

Hypothesis 4: speculative activities lead property prices in mass private residential property sub-market

It is expected that *Hypothesis 3* will be accepted and *Hypothesis 4* will be rejected. That mean property prices should lead speculative activities in mass private residential property sub-market but not the vice versa.

This implies that change of the property prices in mass private residential property sub-market mainly follows the fundamental changes in supply and demand conditions but not the speculative bubbles, with property prices inducing speculative activities but not the vice versa, with the same results as in the overall private residential property market.

It is expected that the mass private residential property sub-market will follow the same implications as in the overall private residential property market, i.e. most of the speculators in Hong Kong's residential markets are acting rationally but not irrationally. Since the majority of private residential properties in Hong Kong are the mass private residential properties, the characteristics of the overall private residential market can be totally or greatly reflected in the mass private residential property sub-market.

3.3.3 In Luxury Private Residential Property Sub-Market (Hypothesis 5 and 6)

Hypothesis 5: property prices lead speculative activities in luxury private residential property sub-market

Hypothesis 6: speculative activities lead property prices in luxury private residential property sub-market

It is expected that *Hypothesis 5* will be rejected and *Hypothesis 6* will also be rejected. That means there is no lead-lag relationship found between property prices and speculative activities in luxury private residential property sub-market.

This implies that the degree of speculation found in luxury Hong Kong's residential markets is not intense regardless the type of speculation involved or dominated.

Chapter 4 Overview of Real Estate Market in Hong Kong

4.1 Introduction

Hong Kong is one of the most unique cities in the world. There are some special characteristics that make the real estate market, especially for the residential property market grows rapidly in the past two decades. Moreover, the property market in Hong Kong is characterized by significant boom and bust cycles and one of the key features of property cycle in Hong Kong is its high volatility. (Wong, Chau & Lai 1996) In this chapter, the characteristics of private residential real estate market with specific to Hong Kong will be discussed first. Then, the characteristics of different class units in Hong Kong will be discussed. Last but not least will be a full analysis on the volatility of the Hong Kong's residential markets.

4.2 Characteristics of Hong Kong's residential markets

Housing is very important which touches the daily lives of everyone who are living in Hong Kong. However, Hong Kong is a small place with a small portion of land that suitable for property development while a large number of populations are required to accommodate. As a result, high rise buildings can be found in Hong Kong everywhere in order to release the pressure of shortage.

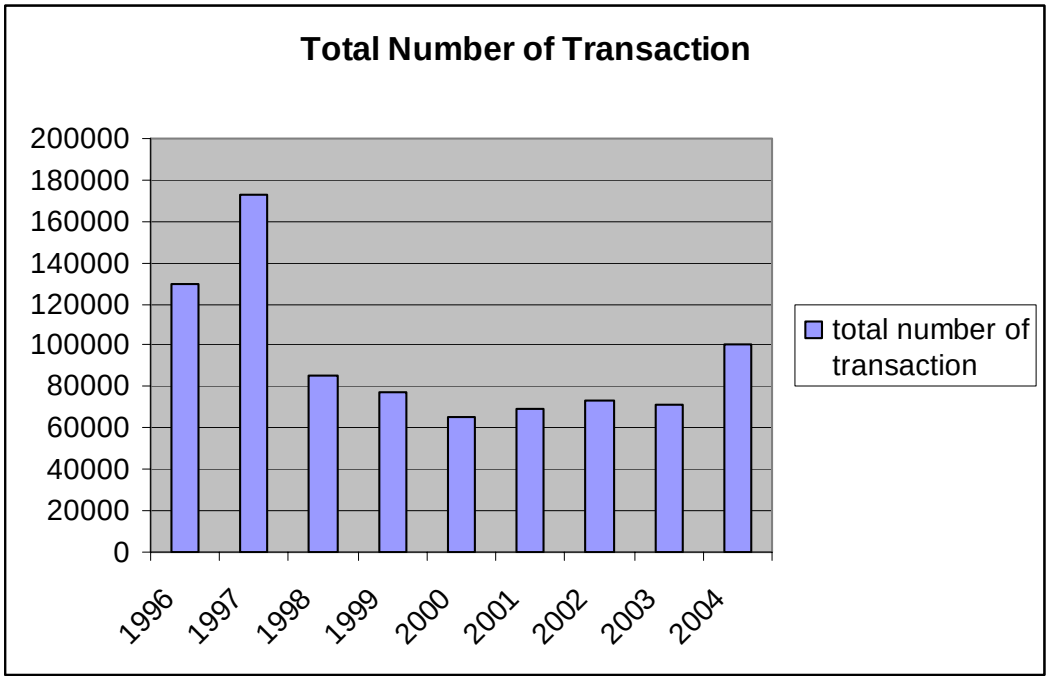
Hong Kong is a major economic force in the Asia-Pacific region. There are some special characteristics which make it different and unique when comparing with other countries in the world. The Hong Kong property market can be characterized as

large number of transactions, high liquidity, limited supply of land, oligopolistic property market and mature market.

1. Large Number of Transactions

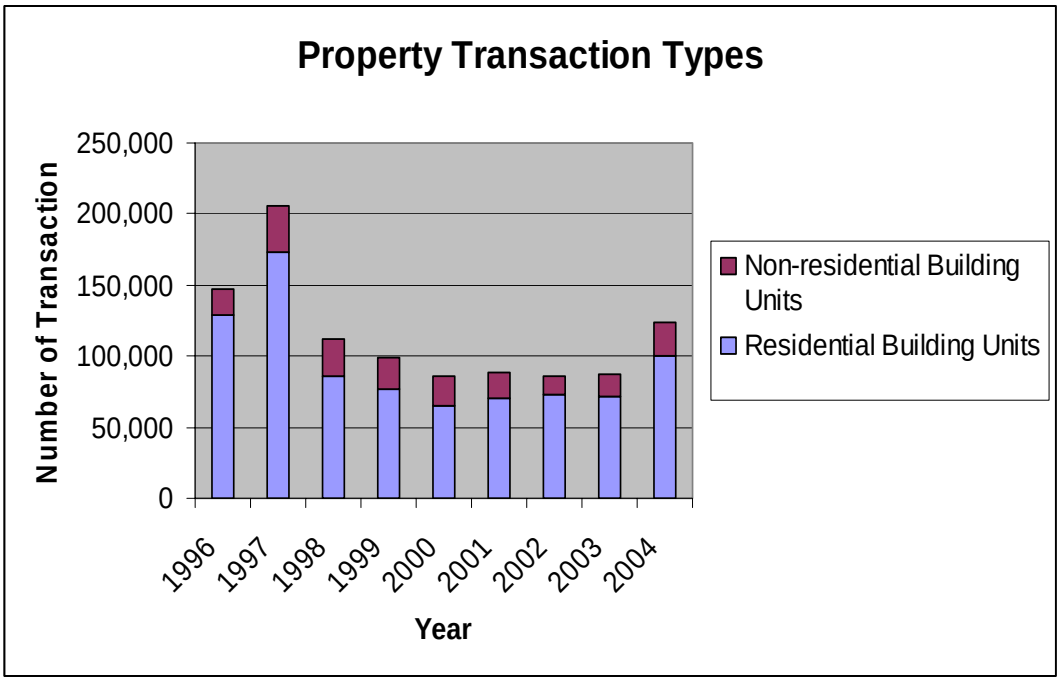
High frequency of transaction is verified by the large number of sales and purchase agreement of building units registered by the Land Registry. *Figure 4.1* shows the number of private residential transactions in a year from the period between 1996 and 2004. The average number of transaction per month is around 8000. The number of transaction is much higher during the property market boom. In 1997, the number of transactions per month even exceeds 20,000. *Figure 4.2* shows that approximate 70% to 90% of the agreements are related to residential property transactions. The frequent trading of property can also be reflected by the large number of estate agencies in the market. The increasing concern of the large number of estate agencies give raise to a licensing system for the estate agency trade which came into effect on 1 January 1999 under the supervision of the Estate Agents Authority, a statutory body established under the Estate Agents Ordinance (Cap. 511). Anyone conduct affairs equivalent to estate agency in Hong Kong must hold a valid license after 1 January 1999.

Figure 4.1: Total Number of Private Residential Transactions



Source: The Land Registry

Figure 4.2: Number of Transaction in Different Property Types



Source: The Land Registry

Moreover, the bank lending policies in Hong Kong also promote purchasing of residential property units. The mortgage ceiling offered by the bank can be as high as 90%, from which the initial down payment of purchasing a flat becomes more affordable.

The Government policies in Hong Kong also play an important role in helping and encouraging public rental housing (PRH) tenants to become home owners by 1) allowing PRH tenants access to Sandwich Class Housing (SCH); 2) widening Housing Authority existing scheme to transfer new rental blocks to Home Ownership Scheme (HOS) for sale; 3) providing a monthly mortgage subsidy for Comprehensive Redevelopment Programme (CRP) households to buy flats in nearby reception estates and 4) launching a new Sale of Flats to Sitting Tenants Scheme.

To conclude, the large number of transactions in Hong Kong is supported much by the banking and the government policies specifically found in Hong Kong.

2. High Liquidity

Property investment holding periods in Hong Kong also have historically been very short; and the market is extremely liquid. Extensive strata-tiling of property assets in Hong Kong increases greatly the affordability of property investments through smaller units which result in high frequency of transaction. During the boom period, it is very common a property can change hand for several times before the actual completion of transaction.

3. Limited Supply of Land

Hong Kong is a small place, with total area of only 1102.56 square kilometres, And owing to the restrictions of landform, 175 square kilometres are developed lands, accounting for 16.0% of the total land area. Among these developed lands, only 33.1% are for housing development. Moreover, the supply of new land is also controlled by the leasehold tenure system in Hong Kong. A leasehold land tenure system means the government is the owner of all the land with the buyers of the land having the right to use their land. The supply of land is further restricted by Sino-British Joint Declaration as it stipulated that the total amount of land granted is limited to 50 hectares per year during the transition period. As a result, in face of the geographical limitations, the development of high rise buildings is the only solution to release the pressure of land shortage.

4. Oligopolistic Property Market

The property development in Hong Kong can be described as Oligopoly. In July 1996, the Consumer Council has investigated on the high degree of market concentration. The report has shown that most of the supplies of property units are provided by a few giant developers that 70% of total new private housing was supplied by seven developers; 55% came from four developers and one developer consistently supplied 25% of new housing units.

Although there is no barrier of entry to be a developer in Hong Kong, it is still very difficult for small developers to compete with giant developers. One of the main reasons is that the land available in the land auction are usually large-scale sites, hundreds millions or even billions capital is required for the project. As a result, giant developers may have the monopolistic power to affect supply of property market and more able to bargain with the government for property development.

5. Mature Market

The Hong Kong property market is a mature market with respect to the availability of legal, finance and other real estate professions. The property market in Hong Kong is efficient with a good system of land registry. The Land Registry aims to maintain an efficient and effective land registration system to facilitate the orderly conduct of land transactions.

4.3 Characteristics of Different Class Units in Hong Kong

In this study, the lead-lag relationship between property prices and speculative activities will be studied. The focus will not only put on the overall private residential property market, but also on the mass and luxury private residential property sub-markets. Therefore, a clear definition and general background for different classes will be given and the characteristics of different classes will be discussed afterwards.

4.3.1 Definition of Different Classes

Table 4.3: Unit Classification

Class	Size of the flat
A	<40 m^2
B	40-69.9 m^2
C	70-99.9 m^2
D	100-159.9 m^2
E	>160 m^2

Source: The Rating and Valuation Department

As referred to the Rating and Valuation Department, the residential markets are classified into five different classes according to the size of the flat, namely class A, Class B, class C, Class D and Class E as shown in *table 4.3*. The professional consultants usually classify mass residential property sub-market to be classes A, B and C, while luxury property sub-market to be classes D and E.

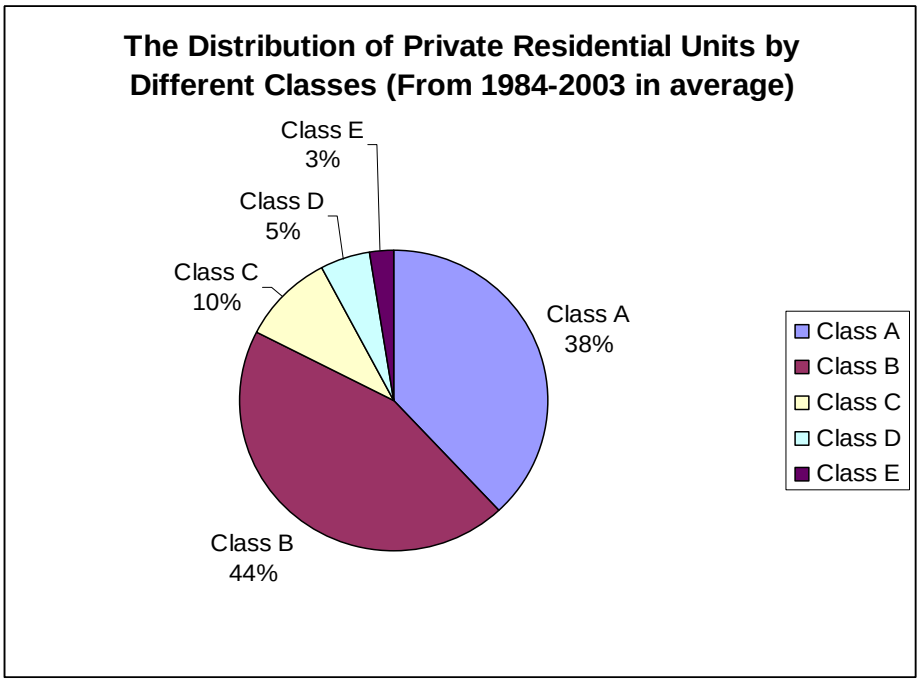
4.3.2 General Background of Different Classes

1. Number of Stock

The property market with smaller flat size is by far the most important in meeting Hong Kong's housing needs. As shown in *Figure 4.4*, from the period between 1984 and 2004, Hong Kong has the largest number of stock in Class B units, with 44% in total, followed by Class A units, with 38% in total, while the least

number of stock in Class E units, only with 3% in total. 92% of the private residential units are from the mass residential units while 8% of the private residential units are from the luxury residential units. The ratio of the number of mass residential property stock to that of luxury property residential stock is about 12:1.

Figure 4.4: Private Residential Stock by Classes



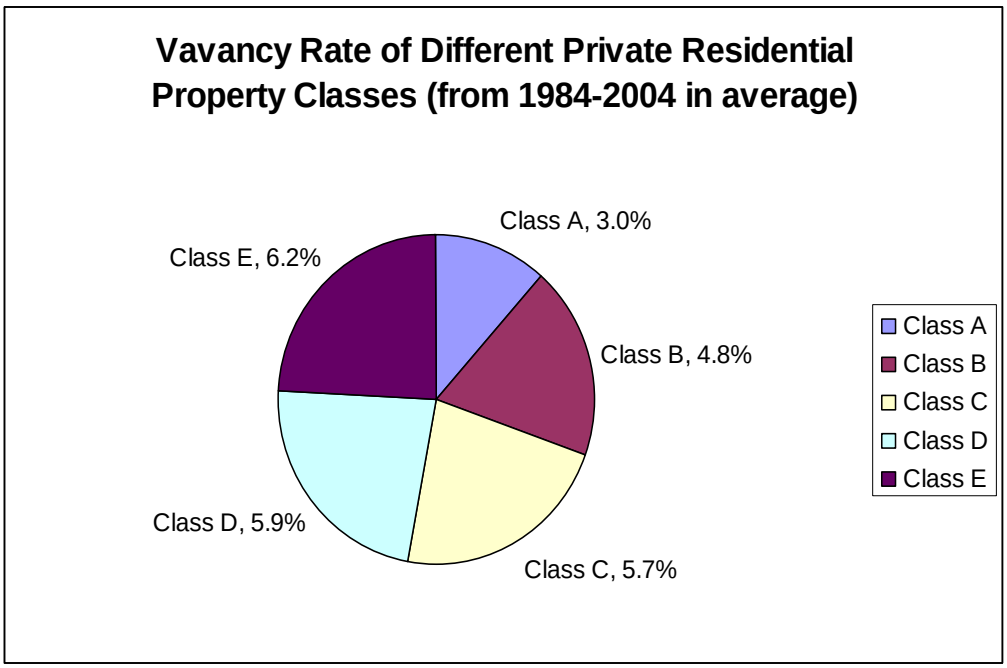
Source: Hong Kong Census and Statistics Department

2. Vacancy Rate

Although there is a substantial housing demand in Hong Kong, there is still some natural vacancy, analogous to the natural unemployment rate in macroeconomics. The vacancy rate ratio of the mass residential property units to that of mass residential property units is 3:4. The supply of the luxury residential property units is much smaller than that of the mass residential property units, but the vacancy rate of the

luxury residential property units is larger than that of the mass residential property units. As shown in *Figure 4.5*, from the period between 1984 and 2004, it is found that Class E units are of highest vacancy, with 6.2% in average, while Class A units are of lowest vacancy, with 3.0% in average. Class E properties are perceived to perform like investment vehicles as people claimed that there is a tradeoff between expected higher rent and duration of vacancy. Thus, the landlord will hold the vacant unit in searching a tenant willing to pay a higher real rent[6]. This can explain the high vacancy of Class E units.

Figure 4.5: Vacancy Rate by Classes



Source: Hong Kong Census and Statistics Department

[6] Hendershott, P.H. and Haurin, D.R. (1988), Adjustments in the real estate markets, AREUEA Journal, Vol. 3

4.3.3 Characteristics of Different Classes

For the mass residential property units in Hong Kong, they are mostly dominated by owner-occupiers instead of tenants and their demand is mainly affected by demographics and affordability of the households. Affordability is a function of variables like mortgage rates, household incomes and bank lending policies (i.e. the length of the mortgage period and down payment requirement). The demand of mass residential property units is driven by good affordability in a climate of full employment and continued upward pressure on wages and salaries.

For the luxury residential property units in Hong Kong, they are more tenant-oriented than owner-occupier market, with the units typically occupied by senior employees for whom housing is part of the remuneration package. Moreover, the floor spaces in the luxury residential property units are more valuable than that of mass residential property units because the luxury market is of much thinner market. The luxury residential units are not affected as much by affordability consideration as by fluctuations in supply and general business conditions. Owing to the thin market of the luxury residential property units, any change in supply will cause substantial change on the demand of the market.

4.4 The Volatility of Hong Kong's Residential Markets

The property prices in real terms and the total volume of private residential property transactions in Hong Kong underwent extraordinarily large fluctuations which will be illustrated as follows.

4.4.1 The Volatility of Property Prices

There were at least six episodes of annual rates of price increases of over 20% and three episodes of sharp declines of a similar magnitude in real property prices in the past two decades. Hong Kong is not the only economy that has undergone pronounced swings in property prices but the boom and bust cycles experienced by other economics are arguable best seem as a single episode of large price increase followed by price falls. (Quarterly Bulletin of Hong Kong Monetary Authority 8/2002)[7] Thus, the price fluctuations in Hong Kong have been as dramatic as those in elsewhere in terms of size but more dramatic in terms of their frequency with which they have occurred.

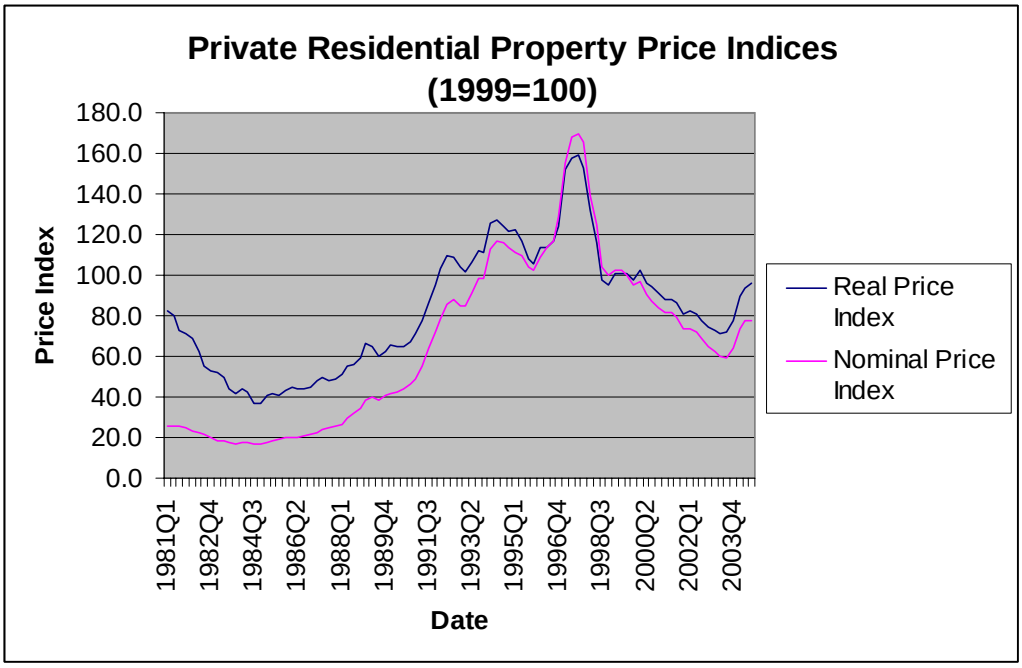
Figure 4.6 plots the real and nominal private residential property prices from the period between 1981:1 and 2004:3. The graph shows that property prices declined sharply between 1981 and 1984, but grew rapidly thereafter until late 1997 when, following the onset of the Asian financial crisis, real estate prices started to slide. By 2003:4, they had declined by more than 40% both in real and nominal terms.

In order to explore the frequency, size and persistence of short-term fluctuations, *Figure 4.7* plots the changes in real property prices over four quarters. It shows that there have been several episodes of sharp price fluctuations. In particular, from 1980, property prices in Hong Kong have undergone recurrent fluctuations and the fluctuations became much volatile since 1990, reaching peaks of four-quarter growth

[7] Quarterly Bulletin of Hong Kong Monetary Authority (8/2002), Bank Lending And Property Prices In Hong Kong

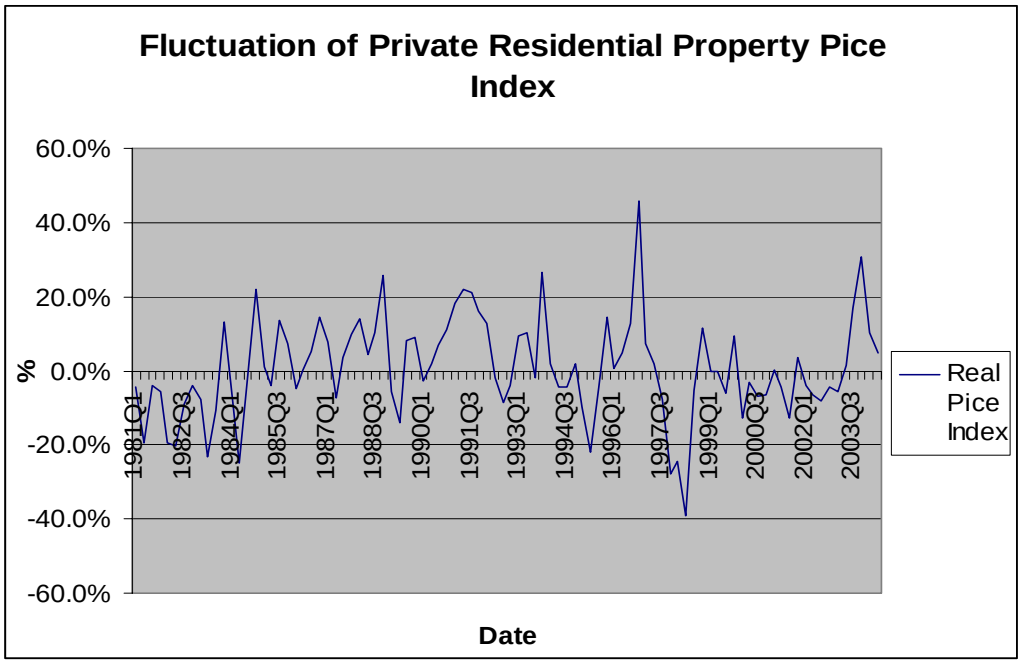
rate of 20 to 45% in 1984, 1989, 1991, 1994, 1997 and 2004, and troughs with price declines of 20% in 1981 to 1984 and 1995 and 40% in 1998 respectively.

Figure 4.6: Private Residential Property Price Indices (1999=100)



Source: Rating and Valuation Department and Census and Statistics Department

Figure 4.7: Fluctuation of Private Residential Property Price Index



Source: Rating and Valuation Department

The Persisting Booming Period: From 1984 to 1997

The booming of the property market is more dramatic in 1990s compared to that in 1980s. The extended property market boom in 1990s is a result of many long-term economic and demographic factors. Long term inflation and low or even negative real interest rates provide a strong stimulus to sustain the price surge in the private housing market. Moreover, low real mortgage rates, growing population, rapid economic growth and inadequate housing supply will continue to put pressure on real estate prices. (Ho, 1992) Besides, increasing household income is also found to be closely related to the housing price movements. These factors will be discussed in detail in the next chapter as these are also the factors contributing to speculation in private residential property market.

The First Bust: From 1981 to 1984

It is observed that from the period between 1981 and 1984, there was a trough in the property market. During that period, the private residential property price had a drop of 30%. It is because during that time, Hong Kong was in political uncertainty that the future of Hong Kong after 1997 was in doubt. Moreover in 1983, the monetary system in Hong Kong was on the brink of collapse because of an uncertain future as the exchange rate of US$1 went through $10. People would prefer to have money in hand than invest in the property market. As a consequence, the demand for private residential units diminished and property price fell. The government implemented the currency board system with the exchange rate of US$1 pegged at $7.8 in October 1983 and the government singed the Sino-British Joint Declaration in

1984. The uncertainty on Hong Kong's future, especially after 1997, was eliminated. Therefore, the confidence of general public re-established and private residential market boosted up again in 1985.

The Second Bust: In 1995

It is observed that from the period between 1994 and 1995, there was another trough in the property market. During that period, the private residential property price has a minor fall of 12%. It is because in early June 1994, the Hong Kong government introduced a series of anti-speculation policies. For example, increase the initial deposit from 5% to 10% of purchase price, prohibit the resale of uncompleted flats before assignment and cut the quota for private sales of uncompleted flats from 50% to 10% to release up 10,000 more private domestic flats directly to home buyers each year. The purpose of the government for introducing the above anti-speculative measures is to control the dramatic rise of the property prices during that period. These anti-speculation policies success in depressing the residential property prices in short-term. In early 1996, the property market revives.

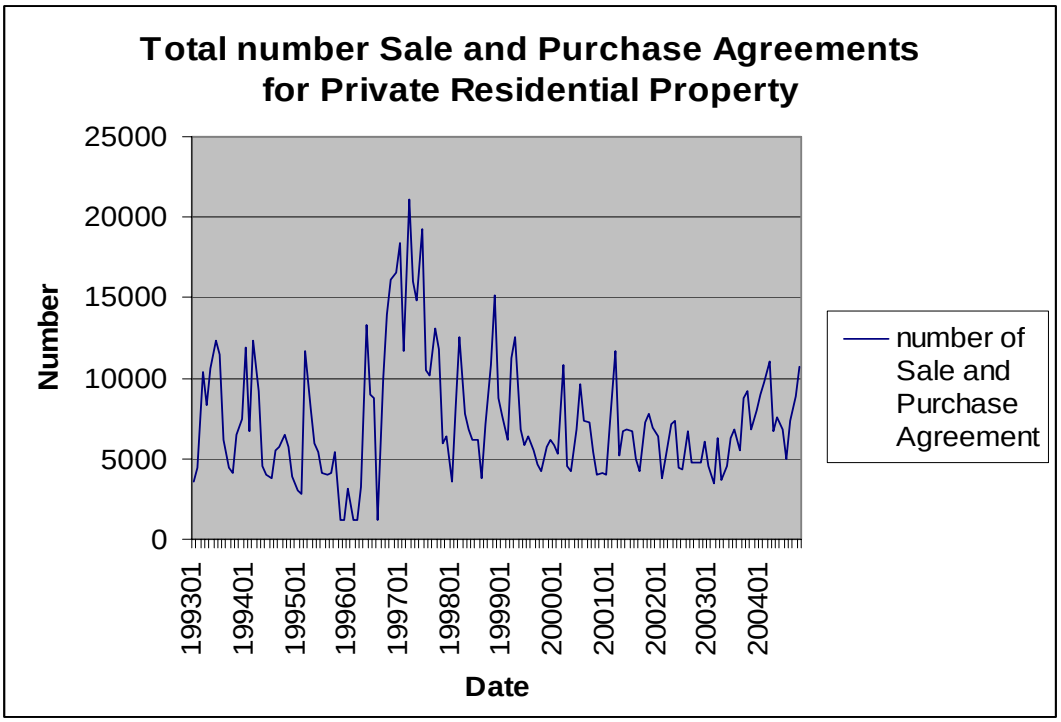
The Third Bust: In 1998

The most dramatic decline of the property price occurred in 1998. The private housing prices have been falling substantially since the Asian Financial Crisis in late 1997. As a small and open economy, Hong Kong could not escape from the regional economic turmoil. The property market recovers in 2003.

4.4.2 The Volatility of the Volume of Sale and Purchase Agreements

From the period between 1993 and 2004, a significant boom was found in 1997 in terms of the number of sale and purchase agreements in private residential property, as shown in *Figure 4.8*. The graph shows that the total volume of sale and purchase agreements underwent extraordinarily large fluctuations.

Figure 4.8: Total Number of Sale and Purchase Agreements for Private Residential Property

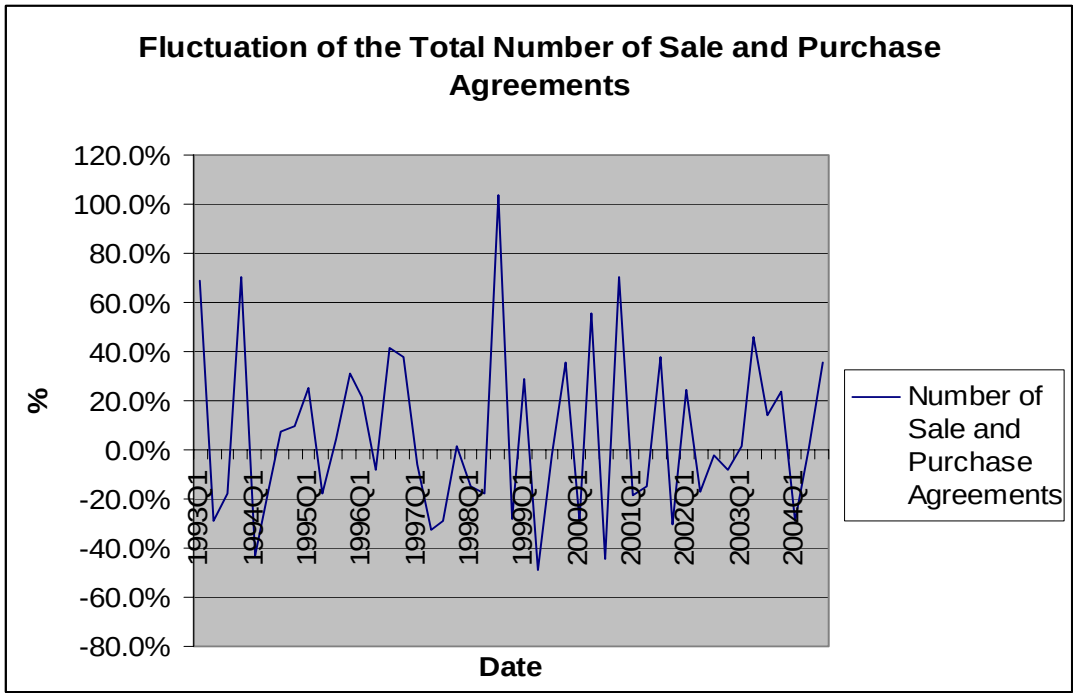


Source: Economics Price Research Centre

Figure 4.9 plots the changes in the total number of sale and purchase agreements over months. It shows that there have been frequent and dramatic fluctuations found in the total number of sale and purchase agreements. When compared with the fluctuations of the property prices, changes in the total number of sale and purchase

agreements were of much larger magnitude, up to 100% increase in the number of sale and purchase agreements was found in 1997. And it is observed that the negative changes of the total number of sale and purchase agreements are less volatile than that of the positive changes.

Figure 4.9: Fluctuation of the Total Number of Sale and Purchase Agreements



Source: Economics Price Research Centre

Chapter 5 Speculative Activities in Real Estate Market

5.1 Introduction

This first part of this chapter aims to provide some evidence of speculation in Hong Kong's residential markets during 1990s and in the second part, different macro-economics factors which triggered housing speculative activities will be identified and discussed in detail.

5.2 Changes Caused by Speculative Activities

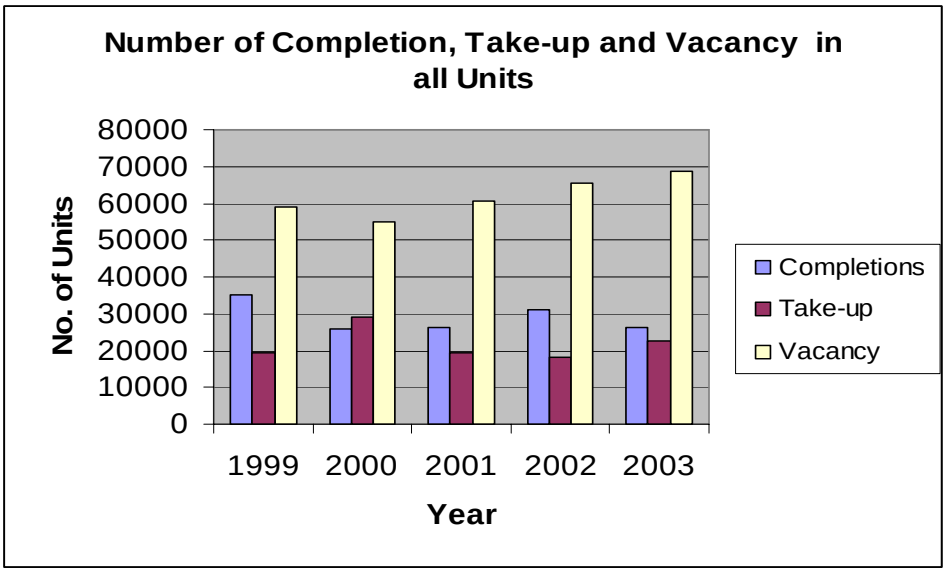
5.2.1 High Vacancy Rate

A unit is regarded as vacant if it is not put to beneficial use, i.e. neither use for dwelling nor storage. The vacancy rate is the proportion of the housing stock that is currently unoccupied. When the property price is expected to appreciate, property owners will delay their sales in order to wait for an upsurge in price so that they can make more profits. The speculators will simply buying or holding the premises for a short term and waiting for price increase to resell and gain a profit. Speculation therefore adds pressure to the demand and it further reduces the number of flats available to end-user buyers, causing the price to increase. Therefore, high vacancy rate can be seen as a manifestation of speculation.

Figure 5.1 shows the number of completion, take-up and vacancy in the property market from the period between 1999 and 2003. It found that the total number of units

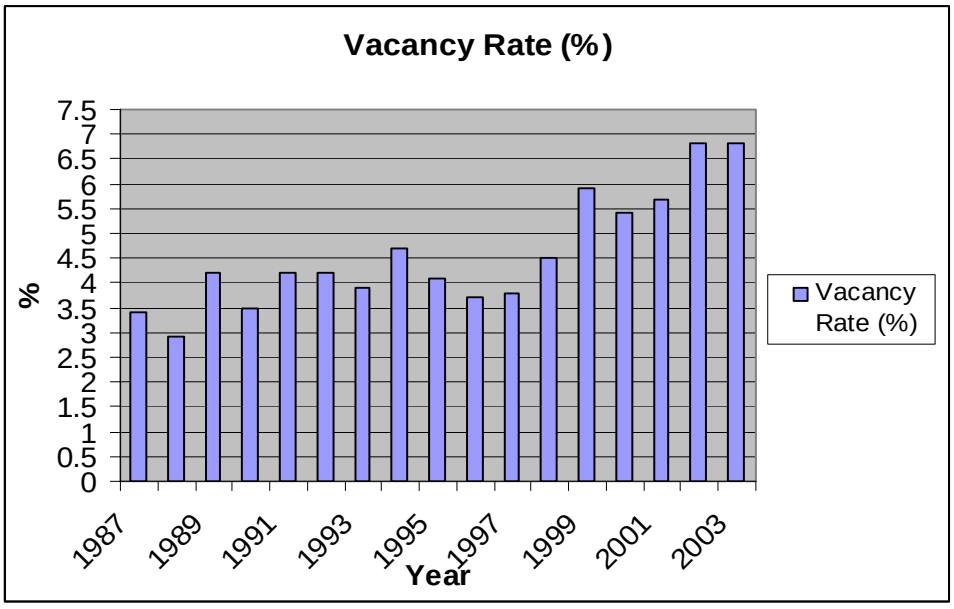
left vacant is 50% higher that that of the total number of completions or take-up units. The vacancy rate of the property units from the period betweeb1987 and 2003 is shown in *Figure 5.2.* It is observed that the vacancy rate is maintained at a high level as a consequence of speculative activities.

Figure 5.1: Total Number of Completion, Take-up and Vacancy in All Property Units



Source: Hong Kong Census and Statistics Department

Figure 5.2: Vacancy Rate in Property Units



Source: Hong Kong Census and Statistics Department

5.2.2 Rapid Turnover of Property Ownership

The ultimate aim of speculation is to make a profit upon sale, speculators usually resale the property in a short period of time after a profit has been made. Rapid turnover of ownership is due to speculators selling their properties quickly as soon as a profit can be made. Financially strong speculators can afford to hold on to their properties for much longer period of time because they can afford higher risks. The higher the number of resale, the larger the number of Sale and Purchase Agreement is signed. This indicates a rapid turnover of ownership which means there are active speculative activities.

5.3 Factors Contributing to Speculation in Hong Kong's Residential Markets

Factors contributing to speculative activities in private residential property market can be divided into demand side and supply side factors. Speculation is caused by a shortage of supply while there is an increasing strong demand for property. Since speculation is a forward-looking decisions based on the expectations about the market conditions in the future, any anticipated increase in property prices will lead to speculation in housing market.

5.3.1 Demand Side Factors

5.3.1.1 Favourable Financial Terms

In general, the highly leveraged of housing units, i.e. the higher the mortgage loan one can get from the banks, implying that a relatively smaller down payment is needed when buying a housing unit. Thus, favourable financial terms will contribute to more speculative activities as the financial burden on the purchasers to buy a flat is comparatively lower.

Financial institutions are the main source of funds to offer loans to home buyers in the property market in Hong Kong and the loan-to-valuation ratio offered for residential mortgage ranges from 70% to 90%. This highly leveraged of housing in Hong Kong decreased the mortgage burden on speculators with the cost to buy a flat relatively lower. Therefore, it added pressure to speculative demand and so the level of speculation becomes more severe.

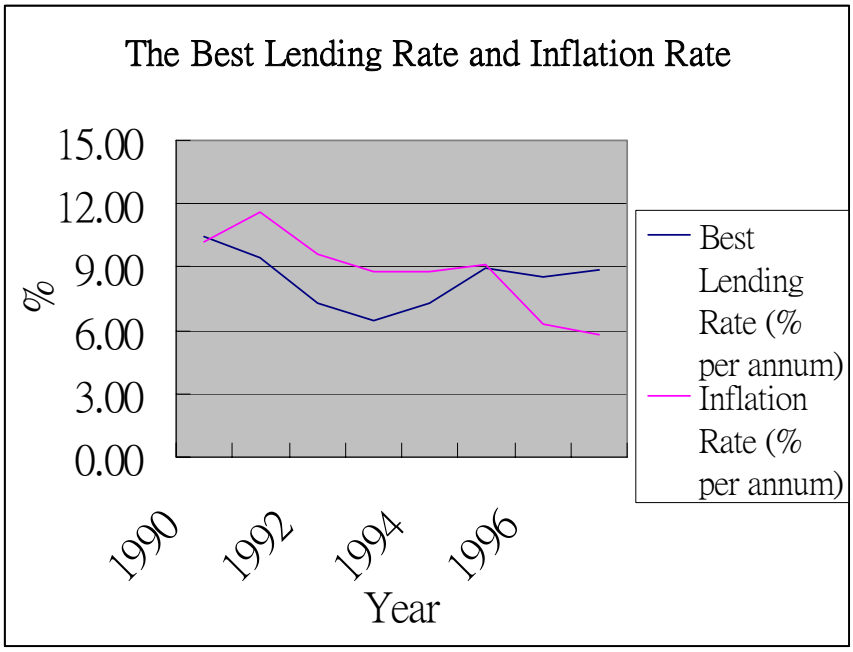
5.3.1.2 Negative Interest Rate

The pegged exchange rate and the negative real interest rates were stimulants on the demand side of the property market. Because of the linked exchange rate system, prime rates in Hong Kong cannot deviate significantly from that in the U.S., resulting in interest rates being lower than the rate of inflation, i.e. negative interest rates. The situation has encouraged property investment as a way of hedging to safeguard the value of saving from being eroded by persistent inflation.

Figure 5.3 shows the best lending rate and the inflation rate from the period between 1990 and 1997, the best lending rate stayed below the inflation rate from the period between 1990 and 1995. Many speculators seized this opportunity to borrow at

negative real interest rates and invested in the property market in order to seek short-term capital gains. From that time onwards, the investment motive gained heavier weight relative to the consumption motive in the demand for home ownership.

Figure 5.3: The Best Lending Rate and Inflation Rate



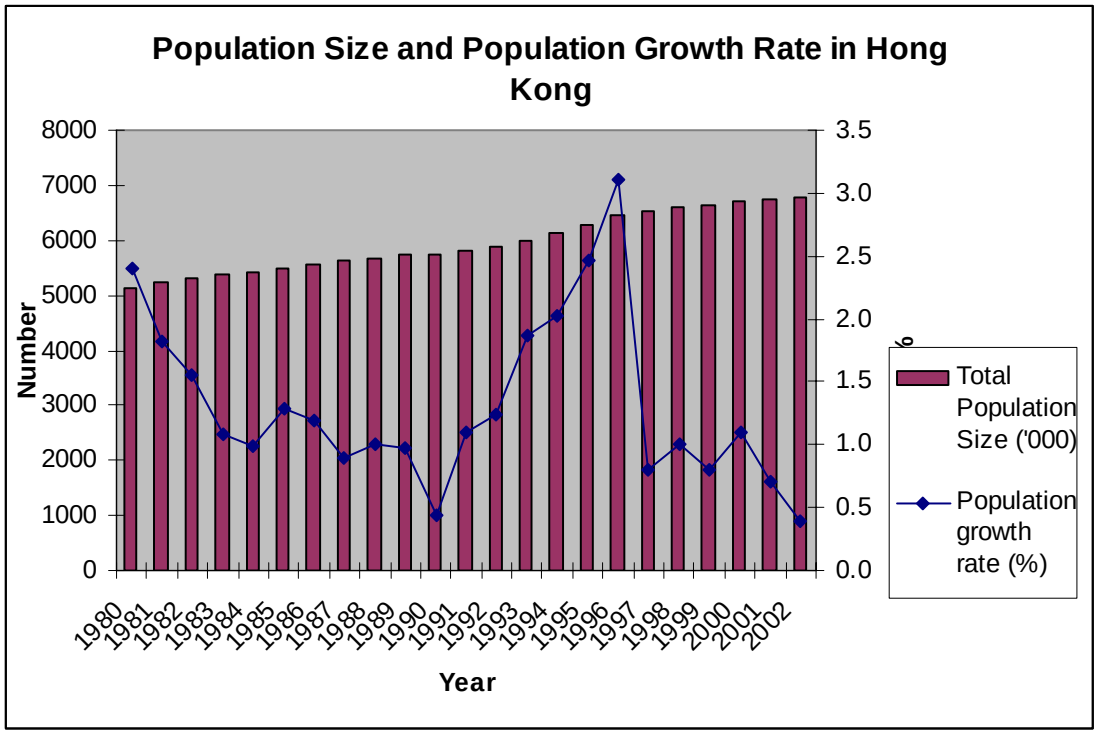
Source: Hong Kong Census and Statistics Department

5.3.1.3 Demographic Changes

The continuous growth of population added pressure to the demand of housing which intensified the problem of housing storage in 1990s. It led to an anticipated increase in property prices which triggered speculation in housing market. *Figure 5.4* shows the population size and population growth rate in Hong Kong from the period between 1980 and 2002. It is observed that starting from 1990; the rate of growth of population was increasing from 0.4% to 3.1%, which it peaked at 1996, with a total population size of 6467000.

The population growth in the 1980s was mainly due to massive influx of immigrants rather than natural internal growth. These new immigrants required additional dwellings to cater for their housing needs. However, under the regulations of Hong Kong Housing Authority, the immigrants are ineligible for public housing, home ownership scheme or temporary housing area as they are not the permanent residents of Hong Kong. Therefore, they could only meet their housing needs in the market of private residential property which led to an excessive demand for housing.

Figure 5.4: Population Size and Population Growth Rate in Hong Kong

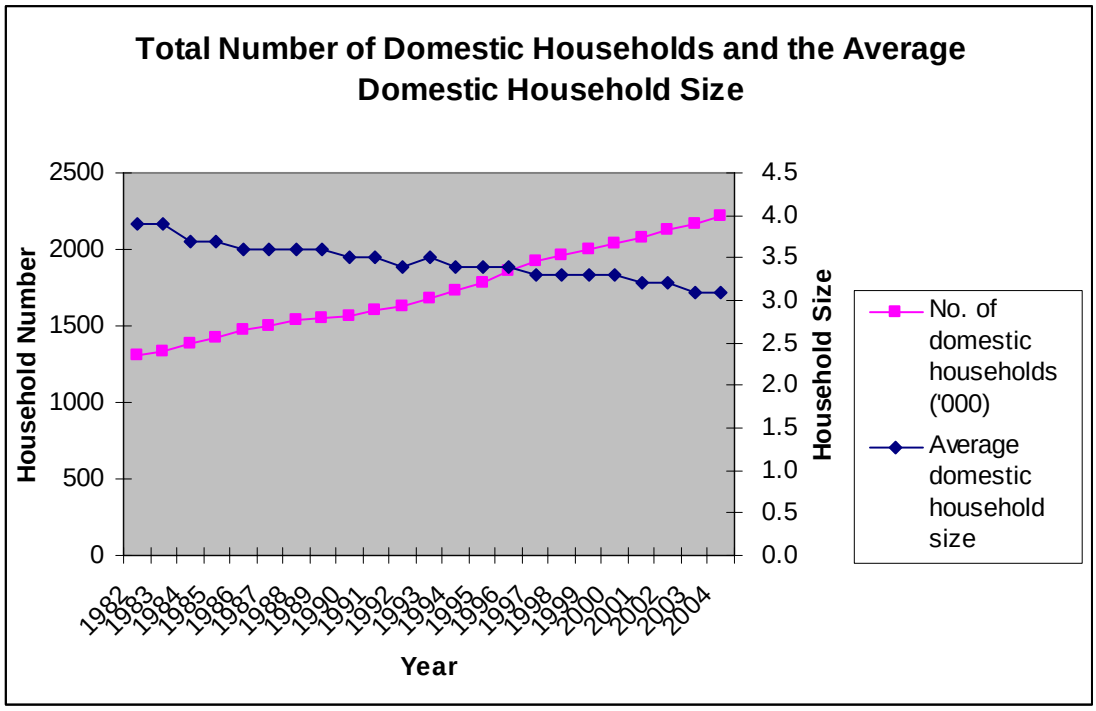


Source: Hong Kong Census and Statistics Department

In addition, changing structure in family composition is another cause for speculation. Since 1980s, traditional large family size was no longer a custom; the family size of household is gradually decreasing from 3.9 persons per household in

1982 to 3.1 persons per household in 2004 and at the same time, with increasing number of domestic households was found, increased from 1311600 in 1982 to 2219700 in 2004, as shown in *Figure 5.5*. This popularity of small family size further increased the demand in housing and triggered speculation.

Figure 5.5: Total Number of Domestic Households and the Average Domestic Household Size



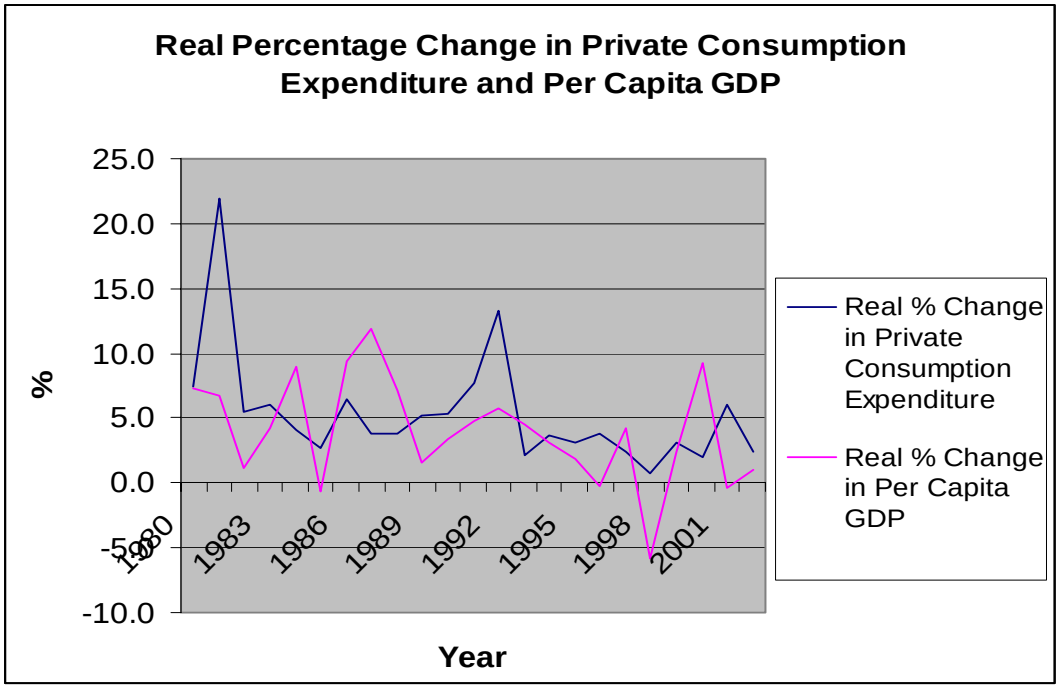
Source: Hong Kong Census and Statistics Department

5.3.1.4 Increase in Income

Increasing affluent will generate higher desire for homeownership and better living conditions. That means higher income will have greater demand for housing which triggered speculation. Increasing financial ability can be reflected by increasing per capita Gross Domestic Product (GDP) and private consumption expenditure.

Figure 5.6 shows the real percentage change in private consumption expenditure and per capita GDP, almost all indicators show a growth in real terms from the period between 1980 and 2002, except that there is a significant negative change in real percentage of per capita GDP just after the Asian financial crisis. These positive changes can reflect the increasing financial ability of the household which eventually amplified the demand for housing in 1980s and early 1990s.

Figure 5.6: Real Percentage Change in Private Consumption Expenditure and Per Capita Gross Domestic Product (GDP)



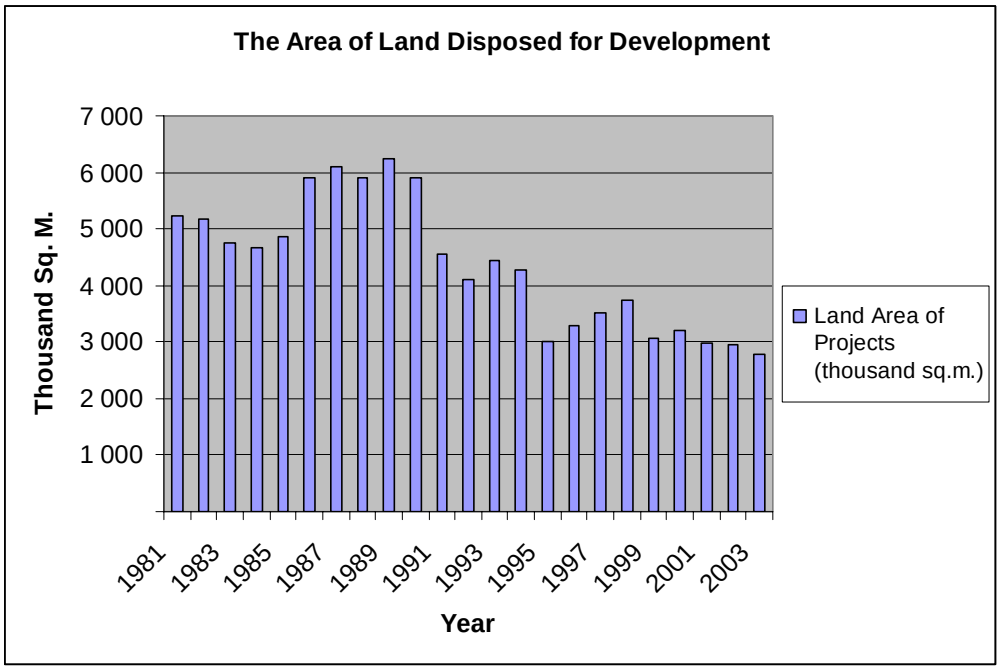
Source: Hong Kong Census and Statistics Department

5.3.2 Supple Side Factors

5.3.2.1 Limited and Inelastic Land Supply

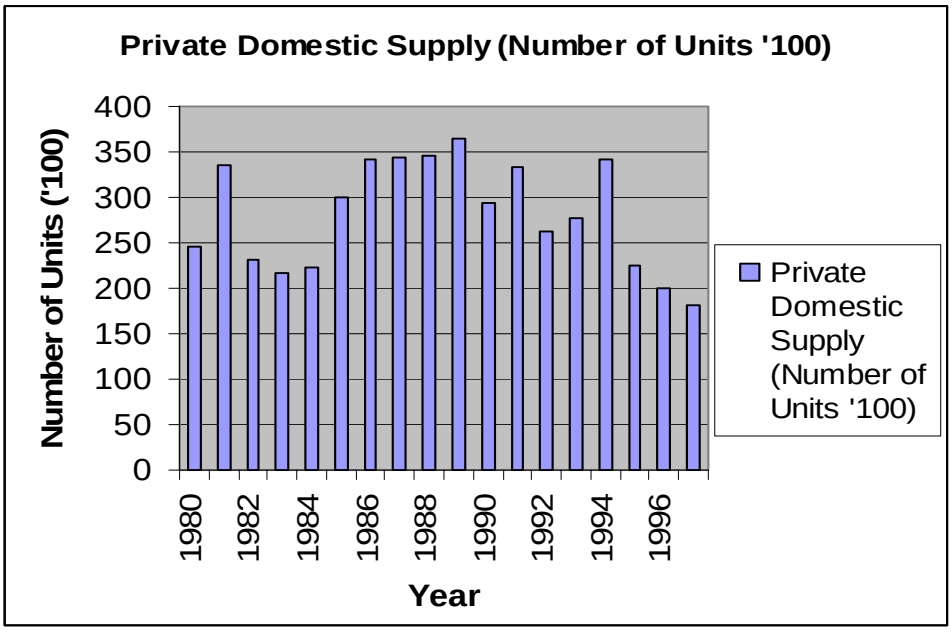
As mentioned in Chapter 4, the supply of land in Hong Kong is limited owing to its geographical limitations. And according to the Sino-British Joint Declaration, the total amount of land granted is limited to 50 hectares per year during the transition period. Otherwise, it is necessary for the government to negotiate with the Central Government in the Sino-British Commissions. *Figure 5.7* shows the area of land disposed for development from the period between 1981 and 2003. Although before 1990, the area of land disposed for development were found to exceed 50 hectares, strong supports must be required as to as negotiate with the Central Government for more area of land to be disposed. This sent a clear signal to the market that the supply of land is limited, which was then translated into limited supply of new residential units. *Figure 5.8* shows the annual supple of private domestic units. It has been relatively steady in a long-run.

Figure 5.7: The Area of Land Disposed for Development



Source: Hong Kong Census and Statistics Department

Figure 5.8 Annual Private Domestic Supply



Source: Hong Kong Census and Statistics Department

Moreover, since there is a limited area of land for development and a huge population is to be accommodated in Hong Kong, high rise buildings are the only solution. In consequence, it lengthened the housing development process as the project become more complicated. In Hong Kong, a housing development project generally takes two to three years to complete. Therefore, the supply of housing is inelastic in short-run. When there is unforeseen increase in housing demand, it can only be met by a lagged supply response. As a result, housing price increase dramatically due to the shortage of housing supply and excess housing demand, this volatility of housing price then triggered speculation.

To conclude, speculative activities in private residential property market can be triggered by different demand side and supply side factors.

Chapter 6 Methodology

6.1 Introduction

The correlation between the private residential property prices and the degree of speculative activities in Hong Kong has been investigated in many researches by simple linear regression, as in equation (1) and results shown that certain degree of correlation existed between them.

$$PRI_t = b_0 + b_1 CON_t + e_t \qquad (1)$$

where PRI is the private residential property price at time t; CON is the percentage of confirmor activity at time t. e_t is the error term and b_1 is the coefficient for the variable of the percentage of confirmor activity

However, the data used in the simple linear regression may not be stationary with autocorrelations in e_t such that the classical assumption of ordinary least squares (OLS) on independent and identically distributed error terms is violated, the simple OLS technique cannot guarantee that regression results from (1) are not spurious[8] even the results shown with high R^2 i.e. coefficient of determination which indicates the proportion of variation in the dependent variable, PRI, explained by the variation in the independent variable, CON. Ho & Kwong (2001) cited that the spurious regression problem was first discussed in Yule (1926) on unrelated non-stationary

[8] Ho, H.C & Kwong T.M. (2001), Speculative and Property Price: Chicken and Egg Paradox, *Habitat International*, Vol. 26 p.347-361

variables, which was further examined by Granger and Newbold (1974) and a theoretical explanation of the implications was given in Phillips (1986). Detailed discussions and examples of spurious regressions can be found in Patterson (2000).

Besides, correlation does not necessarily imply they contain causation since correlation looks at contemporaneous relationship, in one direction, which is a measure of the degree of linear association between the random variables, while causality looks at the dynamic relationship among variables, in both directions. The presence of correlation does not entail the presence of lead lag relationship; similarly, the absence of correlation does not eliminate the possibility for the presence of lead lag relationship.

The aim of this study is to find out the lead-lag relationship between property prices and speculative activities in Hong Kong's residential markets. Therefore, an in-depth mathematical analysis of the dynamic relationship between the private residential property price and speculative activities in Hong Kong will be carried out in this study by performing Augmented Dicker-Fuller (1976) unit root tests and Granger (1969) causality tests.

6.2 Augmented Dicker-Fuller Unit Root Tests

Regardless of the analysis of linear or dynamic relationship, the time series data employed must be stationary in order to make the empirical results convincing. Stationary time series mean the series are not trended with the variance of the time series does not change over time. In fact, many time series, particularly

macroeconomic time series, are non-stationary[9]. Using non-stationary time series in the analysis will cause adverse statistical consequences and it is actually inherently misleading. Thus, Unit root test permits researchers to determine whether the data series is stationary or not. If the series is non-stationary, the data can then be differenced to stationary, it is said to be integrated of order d, I (d), with d unit roots, where d is an integer indicating how many differences needed to be taken before the series become stationary.[10]

Therefore, it is important to determine whether the time series data contain a unit root in co-integration analysis. The presence of the unit root indicates the series are trended which means the variance of the time series changes over time. Otherwise, the time series is not trended and the data is stationary.

There are many tests for a unit root, like Phillips (1987) and Phillips and Perron (1988) and the unit root tests due to Dicker-Fuller (Fuller 1976, Dickey and Fuller 1979, 1981) are first proposed and the most common unit root tests are the Dicker-Fuller (DF) and the Augmented Dicker-Fuller (ADF) test[11], which jointly called the Augmented Dicker-Fuller test. A review of an appropriate testing strategy is to be found in Dickey and Rossana (1994) and also Dolado, Jenkinson and Sarvilla-Rivero (1990). The unit root test adopted in this study follow the framework of the Augmented Dicker-Fuller test.

[9] An economic series that follows a random walk process is called non-stationary over time. A non-stationary variable may reach stationarity by differencing.
[10] Patterson, K.D. (2000), "*An Introduction to Applied Econometrics: A Time Series Approach"*, New York, St. Martin's Press.
[11] When specifying the number of lagged first difference terms to add to the test regression, selecting zero yields the DF test while choosing numbers greater than zero generate ADF test.

In each case the test for a unit root is a test on the coefficient of the lagged dependent variable in the regression. The output of the ADF test consists of the t-statistics on the coefficient of the lagged test variable and critical values for the test of a zero coefficient. If the coefficient is significantly different from zero, with a large negative value, the hypothesis that the time series data contains a unit root is rejected and the hypothesis is accepted that the time series data is stationary rather that integrated.

Under the null hypothesis of a unit root, the result must be referred to the critical values presented in the test output. However, the reported t-statistic does not have the normal distribution so that it will be inappropriate to use conventional normal or "t" tables to look up for the critical values. The appropriate critical values are chosen on the basis of the number of observations and the estimation option[12] i.e. depends on the sample size, and have been tabulated by Fuller (1976) based on Dickey (1975). These critical values are obtained by simulation[13].

Given this distribution, critical values for particular significance levels can be extracted just as in the case of the ordinary "t" statistic, the usual choice of significance levels being 1%, 5% and 10%.

If the Dickey-Fuller T-statistic is smaller, with the Dickey-Fuller T-statistic more negative than the critical values, the null hypothesis, the hypothesis of non-stationary and the existence of a unit root, will be rejected while if Dickey-Fuller T-statistic is

[12] Engle, R.F. and Granger, C.W.J. (1987): "Co-integration and Error Correction: Representation, Estimation and Testing", Econometrica, 55, p.251-276.
[13] Patterson, K.D. (2000), "*An Introduction to Applied Econometrics: A Time Series Approach"*, New York, St. Martin's Press

less negative than the critical values, the hypothesis of non-stationary and the existence of a unit root cannot be rejected. Then it might conclude that the series is non-stationary. Afterwards, the test of whether the series I (1) (integrated of order one) or integrated of a higher order should be carried out. A series is I (1) if its first difference does not contain a unit root. The ADF test can be repeated on the first difference of the series to test the hypothesis of integration of order one against higher orders.

The test can be repeated on second difference if the result of the first difference is non-stationary and unit a stationary series is obtained.

6.3 Granger Causality Tests

The Granger causality tests must perform with stationary data series and non-stationary data series will lead to spurious causality. Thus, before applying Granger causality tests, we must ensure the data series are stationary by carrying out Augmented Dicker-Fuller tests.

The definition of causality employed in this study is that given by Granger (1969). The concept of Granger (1969) causality is to test the lead-lag relationship between two variables, say X and Y, given that both X and Y are stationary time series data. The principle of Granger's approach is to test whether one variable, X, causes another variable, Y. This can be shown by investigating how much of the current Y can be explained by the past values of Y and whether adding lagged values of X can improve the explanation, as shown in equation (2), or vice versa since the

relationship is dynamic, as shown in equation (3) which based on an ordinary least square (OLS) estimation.

$$Y_t = \alpha_o + \sum a_i Y_{t-i} + \sum b_i X_{t-i} + e_t \qquad (2)$$

$$X_t = \alpha_o + \sum a_i X_{t-i} + \sum b_i Y_{t-i} + e_t \qquad (3)$$

where X and Y are the two test variables, e_t is the error term, a and b are the parameters need to be estimated, t is a particular time

For equation (2), Y is said to be Granger-caused by X if X helps in the prediction of Y, or equivalently. If the coefficients on the lagged Xs are statically significant[14], or vice versa for equation (3). It should be borne in mind that the statement "X Granger causes Y" in equation (2) does not imply that Y is the effect or the result of X. Granger causality measures precedence and information content but does not by itself indicated causality in the more common use of the term[15].

In this case, there are two null hypotheses being tested i.e. X does not Granger-cause Y in equation (2) and Y does not Granger-cause X in equation (3). Output from the regression gives the relevant F-statistics and probability of occurrence, i.e. p-value, for these hypotheses.

The F-statistic is defined as the ratio of the explained to the unexplained variance (Flemming and Nellis 1994). It determines whether or not all of the partial regression

[14] Granger, C.W.J. (1969), ibid
[15] ibid

coefficients are equal to zero. The F-statistic can be used to test for the significance of the R^2 statistics, i.e. the coefficient of multiple determinations. The R^2 follows an F distribution with k and the n-k-1 degree of freedom, n is the number of observations and k is the number of independent variables. The F test would be performed to determine the significance level of causality between the causal variable and the dependent variable. The calculated F ratio will be compared to a critical value obtained form the tables of the F distribution with a given significance level. The lower figure of F-statistics refers to the lower level of significance, and vice versa. The higher significance level means the partial regression coefficient does not have a value of zero. The null hypothesis is rejected and a significant relationship between the dependent variable and the lead-lag relationship can be concluded.

Apart form utilizing the F-statistics to obtain the causality tests results, p-values can also be manipulated to obtain the results by using E-view 4.0. The p-value is the type 1 error or the chance that the estimated coefficient is equal to zero. The smaller the p-value is, the more significant the estimated coefficient. If the p-value for a null hypothesis, say X does not Granger-cause Y in equation (2), is significantly small, i.e. smaller than 5% of the confident level, then that null hypothesis can be rejected. Then it can conclude that X does Granger-cause Y. If both of the null hypotheses do not give a significantly small probability, then no null hypotheses can be rejected such that it can be concluded that no Granger-causes occur in the variables.

For testing of the null hypotheses, different lags of the variables, variable X in equation (2) and variable Y in equation (3) will be introduced. The number of lags chosen in estimating equation (2) and equation (3) will have an impact on the

decision to reject or accept the hypotheses. This is inappropriate to use one or two lags as information at one or two lags is not enough to reveal the true underlying lead-lag relationship between two variables.

Chapter 7 Data and Sources

7.1 Mass and Luxury Private Residential Properties

The overall residential property market comprises different types of properties, and the types of the property can generally categorize into two different distinct types, the mass and luxury private residential properties. In this study, apart from the study of the lead-lag relationship between the private residential property price and the speculative activities in the overall private residential property market in Hong Kong, the overall market will further divide into two sub-markets, the mass private residential property sub-market and the luxury private residential property sub-market for investigation.

As mentioned in Chapter 4.4, the mass residential property sub-market refers to Class A, Class B and Class C properties while luxury residential property sub-market refers to Class D and Class E properties under the definition of the Rating and Valuation Department and this study follows the same definition for the mass and luxury residential property sub-markets.

In 2003, approximately 93% of the overall private residential property was comprised by the mass private residential property units. And from the period between 1984 and 2003, about 92% of the overall private residential property was comprised by the mass private residential property units. The rationale for grouping the residential property market into two sub-markets is because the market in Hong Kong is highly segmented due to heterogeneity of housing units. For example, the

quality of building materials varies greatly, as indicated by construction cost differentials. Moreover, facilities such as clubhouses, swimming pools and tennis courts are provided in luxury residential complexes, which are usually situated in quiet locations. The buyers' and speculators' characteristics are different in these two sub-markets. In the luxury private residential property sub-market, more buyers will be the corporations but not the individuals.

Therefore, the effect of the fluctuation of property prices to the fluctuation of the degree of speculative activities or the effect of the fluctuation of the degree of speculative activities to the fluctuation of property prices in these two sub-markets may come up with different results owing to their different nature. The analysis of these two sub-markets is worth studying and will be carried out independently in order to have a thorough understanding of the lead lag relationship between the property prices and the speculative activities in Hong Kong's residential markets.

7.2 Required Data

7.2.1 Residential Property Prices

The private residential property price index is used as a measure of the property prices since every price index is complied to have the same base year which brings easy and accurate comparison of the price data. However, there are nominal and real price indexes. In principle, the type of price index to be used depends on whether the typical household's purchasing decision is based on calculations of the nominal expenditures the purchase will entail or based on the calculations of its expected real

rate of return[16]. In our study, it is assumed that the decision is based on calculations of the nominal expenditures the purchase will entail. Therefore, nominal price index is adopted instead of the real price index for the analysis in this study.

The analysis of the dynamic relationship is divided into three different parts, the overall private residential property market, the mass private residential property sub-market and the luxury private residential property sub-market. The nominal property price indexes of different types which available in the *Hong Kong Property Review* are used as the measure for different types of private residential property prices. 1) the price index which compiles the nominal prices for the transactions of all Class A, Class B, Class C, Class D and Class E properties is adopted as the measure of the *overall private residential property prices*; 2) the price index which compiles the nominal prices for the transactions of Class A, Class B and Class C properties is adopted as the measure of the *mass residential private property prices* and 3) the price index which compiles the nominal prices for the transactions of Class D and Class E properties is adopted as the measure of the *luxury residential private property prices*. All price indexes adopted in this study are complied to have the same base year 1999 in order to have accurate calculation and analysis.

7.2.2 Confirmor Transaction Volumes

The number of confirmor transactions is used to reflect the degree of the speculative activities. Speculative activities mean the sale or purchase of property being motivated by the capital gains which can be foreseeable in the future with the

[16] Hort (2000), Prices and Turnover in the Market for Owner-occupied Homes, *Regional Science and Urban Economics,* Volume 30, pp.108

focus on the intention of the purchasers or seller. And a confirmor is defined as a property that is resold after the sale and purchase agreement, but before the completion of the transition i.e. re-selling of the flat after the signing of the sale and purchase agreement but before the signing of the deed of assignment. The reason for using confirmor transactions as a proxy of the speculative activities is because confirmor transactions involve quick resale with a view to reaping short-term capital gain which can reflect the intension of the buyer or seller being motivated be perceived capital gains. Thus, the number of confirmor transactions is the best proxy for the speculative activities.

7.2.3 Total Transaction Volumes

The total number of sale and purchase agreements of building units in the private residential property market is used as a measure for the total transaction volume. The number of sale and purchase agreements instead of the number of assignments, with the actual transfer of legal title of the property at which the transaction of the property is completed, is chosen because the intention of the buyers or sellers are focused in this study and it does not necessarily important whether the transaction is ultimately completed or not. This intention can be estimated quantitatively by the number of the sale and purchase agreements being signed.

7.2.4 Ratio of Confirmor Transactions

Quantifying speculation has been one of the major difficulties in testing the relationship between speculation and property prices. In this study, the ratio of

actual number of confirmor transactions to total number of transactions is taken as a proxy for the intensity of speculation since confirmor transactions must be speculative in nature. It is because different market conditions will exert different degree of influence on the actual number of confirmor transactions, the actual number of confirmor transactions during boom period is more likely to be greater than the actual number of confirmor transactions during burst period. However, different market conditions will have similar degree of influence on the actual number of confirmor transitions and the total number of transactions. Ratio of confirmor transactions can eliminate the influence of the market conditions by having the nominator and denominator moving in the same direction in a more or less extent. Therefore, ratio of confirmor transactions is adopted as the proxy for the intensity of speculation

The numbers of confirmor transactions and the total number of sale and purchase agreements are obtained through the Economic Property Price Centre (EPRC) by choosing different "natures" of property transactions in the EPRC, i.e. with the nature of "SUB-ASP" (the sub-sale of the property after the signing of the agreement of sale and purchase) and "ASP" (agreement of sale and purchase) respectively.

In our study, 1) the ratio of overall confirmor transactions is adopted as the measure of the intensity of speculative activities in the overall residential market, 2) the ratio of mass confirmor transactions is adopted as the measure of the intensity of speculative activities in the mass residential sub-market and 3) the ratio of luxury confirmor transactions is adopted as the measure of the intensity of speculative activities in the luxury residential sub-market.

7.3 Time Series Data Description

The relationship between property prices and speculative activities in Hong Kong's residential markets is investigated. Therefore, it is better to have a longer period of time series data for the analysis of the long run lead-lag relationship. In our study, the study time period is between January 1993 and September 2004 and monthly data is chosen as the data panel. Since the property market is very sensitive in nature and fluctuate violently from time to time as mentioned in Chapter 4, monthly data panel can provide a more actual analysis. There are 142 monthly observations in total. The symbols of the time series variables are summarized in *Table 7.1*.

Table 7.1: Symbols of the Time Series Variables

Symbols	Variables
PRICE_O	Property Price Index in overall residential market
PRICE_M	Property Price Index in mass residential sub-market
PRICE_L	Property Price Index in luxury residential sub-market
SPE_O	Ratio of Confirmor Transactions in overall residential market
SPE_M	Ratio of Confirmor Transactions in mass residential sub-market
SPE_L	Ratio of Confirmor Transactions in luxury residential sub-market

7.4 Expected Results of the Granger Causality Test

The expected results of the Granger causality tests between property prices and speculative activities in three difference markets for six hypotheses are summarized in *Tables 7.2 to 7.4.*

Table 7.2 Expected Results in OVERALL Private Residential Property Market

Null Hypothesis:	Expected Results
PRICE_O does not Granger Cause SPE_O	Reject
SPE_O does not Granger Cause PRICE_O	Not Reject

Table 7.3 Expected Results in MASS Private Residential Property Sub-Market

Null Hypothesis:	Expected Results
PRICE_M does not Granger Cause SPE_M	Reject
SPE_M does not Granger Cause PRICE_M	Not Reject

Table 7.4 Expected Results in LUXURY Private Residential Property Sub-Market

Null Hypothesis:	Expected Results
PRICE_L does not Granger Cause SPE_L	Not Reject
SPE_L does not Granger Cause PRICE_L	Not Reject

Chapter 8 Empirical Results

8.1 Augmented Dicker-Fuller Unit Root Test

Augmented Dicker-Fuller (ADF) unit roots tests are used to check the stationary of the data series. The ADF unit roots tests are applied first without differencing the data. Natural logarithmic transformation to all data has been applied in order to reduce the problem of heteroscedasticity, having the variance of the errors terms not the same, and to calculate the continuous changes.

Table 8.1 shows the results of the ADF unit roots tests on the natural logarithmic of private property price index and the percentage of confirmor transactions in three different types of private residential property market, the overall, the luxury and the mass private residential property markets, without differencing.

The output of the ADF is represented by the ADF test statistic which is a coefficient of the lagged test variable. All ADF test statistics for the data without differencing as mentioned above have a negative value but all are not significantly different from zero. All ADF test statistics all are less negative than 1% of the critical values. Therefore, the null hypothesis, the hypothesis of non-stationary and the existence of a unit root cannot be rejected. That means all data series are trended and non-stationary.

The ADF unit root tests are then repeated until the non-stationary data series are differenced to stationary. *Table 8.2* shows the results of the ADF unit roots tests on

the natural logarithmic of private property price index and the percentage of confirmor transactions in three different types of private residential property markets.

All ADF test statistics for the data with first difference have a negative value which is significantly different from zero. The ADF t-statistics are all more negative than the 1% of the critical values. Therefore, the null hypothesis, the hypothesis of non-stationary and the existence of a unit root can be rejected. That means all data series are stationary after first differenced.

The ADF unit root tests confirm that the first difference of the natural logarithm of the private residential property price indexes and the percentage of confirmor transactions are all stationary and not trended in the three different property markets. After ensuring the data are stationary, Granger Causality tests can be applied to find the lead-lag relationship between property prices and speculative activities in different types of private residential property markets in Hong Kong.

Table 8.1: Results of the ADF Unit Root Tests

(At the Level)

Variables		Number of Observa-tions	**ADF Test Statistic – Without Differencing**	1% Critical Value	5 % Critical Value	10 % Critical Value
Property price index	OVERALL private residential property market	141	**-2.058906**	-4.0254	-3.4421	-3.1454
	MASS private residential property market	141	**-2.045156**	-4.0254	-3.4421	-3.1454
	LUXURY private residential property market	141	**-2.255536**	-4.0254	-3.4421	-3.1454
Percentage of confirmor transactions	OVERALL private residential property market	141	**-2.799721**	-4.0254	-3.4421	-3.1454
	MASS private residential property market	141	**-2.875030**	-4.0254	-3.4421	-3.1454
	LUXURY private residential property market	118	**-2.836754**	-4.0380	-3.4481	-3.1489

Table 8.2 Results of the ADF Unit Root Tests
(With First Difference)

Variables		Number of Observa-tions	**ADF Test Statistic – With First Difference**	1% Critical Value	5 % Critical Value	10 % Critical Value
Property price index	OVERALL private residential property market	140	**-6.643938***	-4.0259	-3.4424	-3.1456
	MASS private residential property market	140	**-6.816557***	-4.0259	-3.4424	-3.1456
	LUXURY private residential property market	140	**-7.384730***	-4.0259	-3.4424	-3.1456
Percentage of confirmor transactions	OVERALL private residential property market	140	**-12.80790***	-4.0259	-3.4424	-3.1456
	MASS private residential property market	140	**-12.24324***	-4.0259	-3.4424	-3.1456
	LUXURY private residential property market	109	**-13.92468***	-4.0444	-3.4512	-3.1507

Notes:

* indicates statistically significant at 1% level

8.2 Granger Causality Tests

The lead-lag relationship between property prices and speculative activities is tested by using Granger causality test. Before carrying out the Granger causality test, all data series should be taken first difference, i.e. $X = X_t - X_{t-1}$, as the ADF unit root tests confirm that first difference of the data will provide stationary series. Since it is inappropriate to perform the test with one or two lags as information at one or two lags is not enough to reveal the true underlying lead-lag relationship between two variables, the test was then performed with three to six lags in order to confirm the robustness of the test results.

The results of Granger causality tests between property prices and speculative activities in the overall private residential property market with period of time lags from three to six are presented in *Table 8.3.*

Table 8.3: Results of the Granger Causality Tests in Overall Private Residential Property Market

	3 Lags	4 Lags	5 Lags	6 Lags
Null Hypotheses	Probabilities			
PRICE_O does not Granger-cause SPE_O	0.00283*	0.00307*	0.00322*	0.00618*
SPE_O does not Granger-cause PRICE_O	0.96681	0.97972	0.2928	0.3594

* Significant at 5% level - rejection of null hypothesis

From the results, all probabilities of occurrence for the null hypotheses, "PRICE_O does not Granger-cause SPE_O", with period of time lags from three to six, are significantly small, smaller than 5% of the confident level. Therefore, the null hypothesis of "PRICE_O does not Granger-cause SPE_O" is rejected. Then it can be concluded that property prices Granger-cause speculative activities in the overall private residential property market. While all probabilities of occurrence for the null hypotheses, "SPE_O does not Granger-cause PRICE_O", with period of time lags from three to six, are not significantly small, not smaller than 5% of the confident level. Therefore, the null hypothesis of "SPE_O does not Granger-cause PRICE_O" cannot be rejected. Then it can be concluded that speculative activities do not Granger-cause property prices in the overall private residential property market.

The results of Granger causality tests between property prices and speculative activities in the mass private residential property sub-market with period of time lags from three to six are presented in *Table 8.4*.

Table 8.4: Results of the Granger Causality Tests in Mass Private Residential Property Sub-Market

	3 Lags	4 Lags	5 Lags	6 Lags
Null Hypotheses	Probabilities			
PRICE_M does not Granger-cause SPE_M	0.00378*	0.00296*	0.00576*	0.01166*
SPE_M does not Granger-cause PRICE_M	0.96182	0.9909	0.34889	0.45737

* Significant at 5% level - rejection of null hypothesis

From the results, all probabilities of occurrence for the null hypotheses, "PRICE_M does not Granger-cause SPE_M", with period of time lags from three to six, are significantly small, smaller than 5% of the confident level. Therefore, the null hypothesis of "PRICE_M does not Granger-cause SPE_M" is rejected. Then it can be concluded that property prices do Granger-cause speculative activities in the mass private residential property sub-market. While all probabilities of occurrence for the null hypotheses, "SPE_M does not Granger-cause PRICE_M", with period of time lags from three to six, are not significantly small, not smaller than 5% of the confident level. Therefore, the null hypothesis of "SPE_M does not Granger-cause PRICE_M" cannot be rejected. Then it can be concluded that speculative activities do not Granger-cause property prices in the mass private residential property sub-market.

The results of Granger causality tests between property prices and speculative activities in the luxury private residential property sub-market with period of time lags from three to six are presented in *Table 8.5*.

Table 8.5: Results of the Granger Causality Test in Luxury Private Residential Property Sub-Market

	3 Lags	4 Lags	5 Lags	6 Lags
Null Hypotheses	Probabilities			
PRICE_L does not Granger-cause SPE_L	0.17738	0.29079	0.28694	0.39123
SPE_L does not Granger-cause PRICE_L	0.80983	0.07792	0.21904	0.20362

* Significant at 5% level - rejection of null hypothesis

From the results, all probabilities of occurrence for the null hypotheses, “PRICE_L does not Granger-cause SPE_L” and “SPE_L does not Granger-cause PRICE_L”, with period of time lags from three to six, are not significantly small, not smaller than 5% of the confident level. Therefore, the null hypothesis of “PRICE_L does not Granger-cause SPE_L” and “SPE_L does not Granger-cause PRICE_L” cannot be rejected. Then it can be concluded that property price do not Granger-cause speculative activities and also speculative activities do not Granger-cause property price in the luxury private residential property sub-market.

Chapter 9 Discussion of the Results

9.1 In Overall Private Residential Property Market

The results follow the expectation that property prices lead speculative activities in the overall private residential property market but not the vice versa.

Speculation means buying and selling of goods under uncertainty, and expects to resell or repurchase after an anticipated price (Emery, 1986). It focuses on the intention of the purchasers with their motives solely on the perceived capital gains. Speculative activities will only take place if there is uncertainty about future price movements. That is, the uncertainty that stimulates the speculators who consider themselves able to perceive the future price trends. They will attempt to transform their expectations into capital gains. As a result, it is obviously that the only ultimate reason which induces speculation is the expected price change in the future as speculators can capture the capital gains under this uncertainty.

However, many claim that there are lots of macro-economics factors contributing to speculative activities in the private residential property market in Hong Kong and therefore price movements may not be the only reason lead to speculation. Undoubtedly, there are lots of factors mentioned in Chapter 5.3 which contribute to speculation in the property market. And these factors are divided into supply side and demand side. But under the law of demand and supply, these factors ultimately are influencing the equilibrium market price. Only with changes in these economics factors will lead others tend to expect that there is a price change in the future. The

equilibrium price will not change suddenly without other factors influencing under the law of demand and supply. Therefore, all in all, it is the change in the expected price induces speculation.

For example, change in economic conditions and political changes will influence the forward looking behaviour of the investors. If the equilibrium price for a property at time t = 0 is P_t, because of the economical changes, he may foresee that at time t = 1, the price of the property will be P_{t+1}. The difference between P_t and P_{t+1} can either be positive or negative, i.e. a growth or decline in the economy. When there is a economics growth, investors will buy at t = 0 and they expect that the future price of the property will increase.

However, even when there are the present of some economic factors, if these factors do not make people anticipate there is a change in future market price, e.g. the effect of different factors canceling off each other, investors will not speculate as they cannot foreseen any perceived capital gains due to price movements.

We have concluded that it is the expected prices induce speculation, and then it brings to the problem of the relationship between actual and expected price movements i.e. whether the actual market price depends on the expected rate of change. As mentioned previously, if the self-fulfilling expectation of price changes drives the actual price changes*;* this situation is referred as a price bubble and this type of speculation is dominated by informed professional speculators. On the other hand, if its expected rate of change does not drive the actual price but it is the actual price change drives the speculators' motive of speculation instead. Then this type of

speculation is a consequence of property price change that follows fundamental changes in supply and demand conditions. This type of speculation is dominated by uninformed amateur speculators.

The results suggested that property prices lead speculative activities but speculative activities do not lead property prices in overall private residential property market in Hong Kong. This means the dominant type of speculators in overall property market is the uninformed amateur speculators. As it is observed that the majority of people involve in speculation in Hong Kong is the general public who are not specialized in speculation. They are not well-trained professionals and probably will not have the legal knowledge concerning property transactions. They depend much on the estate agents and the lawyers for the legal aspects throughout the transactions. They are sometimes investing like gambling, solely with the intention to have capital gain without applying any strategic skills. The rapid and well development of property agency industry in Hong Kong is a concrete evidence to support this argument. Since the amateur speculators are lack of information and experience so that they are unable to predict the market price efficiently with information other than existing market prices. As a result, the actual price change will drive the speculators' motive of speculation.

Moreover, the speculative activities performed by the uninformed amateur speculators are sometimes unintentional. That means the initial intention of the purchasers is for consumption purpose instead of investment purpose. It is the unanticipated changes in property price in the residential market accounts for the reselling of the property to the market by the purchasers before the completion date of

the transaction. These are the reasons why property prices lead speculative activities in the overall private residential property market.

Undoubtedly, the relationship between property prices and speculative activities also depends on the degree of speculation. The reason for that is because in property market, there are many other factors affecting the property prices. Thus, the degree of speculation must be very intense in order to reveal the relationship between property prices and speculative activities. The results in this study, property price lead speculative activities, proven that the degree of speculation in the overall private residential property market is very intense.

To conclude, there is no evidence that speculators are to be blame for fuelling property prices. In fact, it was the changes in fundamentals (external shocks) that induce speculators to enter the market. Since property is an incomplete market (no short-selling), all speculators must be bullish and thus may be see to be colluding to maintain prices. Since information cost is relatively high and dominated by end users, who are usually non frequent trading and possess fewer information then speculator, therefore, there is room for a professional speculator to earn a profit.

9.2 Results in Mass Private Residential Property Sub-Market

The results follow the expectation that property prices lead speculative activities in the mass private residential property sub-market but not the vice versa which can conclude that the dominant type of speculators is the uninformed amateur speculators and the degree of speculation is very intense in the mass private residential property

sub-market as in the overall private residential property market. And the prime cause for the change in the property prices is the perceived change in market fundamentals.

In 2003, approximately 93% of the overall private residential property was comprised by the mass private residential property units. And from the period between 1984 and 2003, about 92% of the overall private residential property was comprised by the mass private residential property units. Therefore, the characteristics of the overall private residential market can be greatly or totally reflected in the mass private residential property sub-market. Thus, the results in mass private residential property sub-market follow the results as in the overall private residential property market. Hence, in mass private residential property sub-market, property prices lead speculative activities while speculative activities do not lead property prices.

9.3 Results in Luxury Private Residential Property Sub-Market

The results follow the expectation that there is no lead-lag relationship found between property prices and speculative activities in the luxury private residential property sub-market which can conclude that the degree of speculation found in luxury private residential property market in Hong Kong is not intense regardless the types of speculation involved or dominated.

There are two reasons to justify this argument. These are the affordability reason and the risk and return concept.

The asking price for luxury private residential properties are much higher than that of the mass private residential properties, for a mass residential property, it can cost less than one million while for a luxury residential property, it can cost up to several millions. If people expect that there will have an anticipated increase in price which will likely to have capital gain under this uncertainty, financially, people may not have adequate money to purchase the luxury residential properties. In addition, the money required to purchase the mass residential properties comparatively will be much less than the luxury one and it will have greater chance for people to purchase the mass residential properties instead of the luxury one.

If regardless of people affordability and assume that every people are financially affordable to purchase either type of properties. This argument can then be explained by risk[17] and return justification. In society, people will choose the best option under limited resources which can bring the greatest possible return or profit under the lowest risk. Risk can be reduced by pooling of risk. Under the same lump sum of money, more mass private residential properties can be purchased than the luxury private residential properties as the luxury private residential properties cost higher than that of the mass private residential properties. Risk pooling is then more likely to be occurred in mass private residential properties instead of luxury private residential properties. Therefore, risk in mass private residential properties will be lower than that of the luxury private residential properties. Everyone is risk-adverse; people will choose to invest in the properties which have lower risk holding that the return is constant.

[17] Risks are defined as the standard deviations of returns over a certain period

Risk and return should be considered at the same time and *Table 9.1* shows the return of private residential properties in different classes in Hong Kong. The average return for Class A, B, C, D and E from the period between 1993 and 2002 is 5.4%, 4.7%, 4.9%, 4.9% and 4.7% respectively. The results shown that the return of the luxury private residential properties are similarly to that of the mass private residential properties, when compared to Class A property, the return of the luxury private residential properties is even lower.

Table 9.1: The Private Residential Property Market Yields in Different Classes

	Private Residential Property Market Yields (%)				
Year	Class A	Class B	Class C	Class D	Class E
1993	5.5	5.0	5.2	5.4	5.3
1994	5.4	4.7	5.0	5.4	5.2
1995	5.7	5.2	5.6	6.0	5.8
1996	5.2	4.6	4.8	4.9	4.7
1997	4.2	3.7	3.8	3.7	3.4
1998	4.9	4.1	4.3	4.4	4.4
1999	5.2	4.4	4.5	4.5	4.2
2000	5.8	4.9	4.8	4.7	4.4
2001	6.3	5.3	5.4	5.4	5.0
2002	6.1	5.1	5.1	5.0	4.7
MEAN	**5.4**	**4.7**	**4.9**	**4.9**	**4.7**

Source: Hong Kong Property Review

It can be concluded that the ratio of risk to return of speculating in luxury private residential properties is usually smaller than that of mass private residential properties. That means for every unit of return, speculating in luxury private residential properties are subjected to more risk than that of mass private residential properties. Therefore, luxury private residential properties are not a good mean for speculation when comparing with mass private residential properties. People will prefer to speculate in mass private residential properties if they foresee that there is an anticipated change in the market value. Thus, it is reasonable that the degree of speculation in luxury private residential properties is not intense.

Chapter 10 Implication of the Results

10.1 Policy Implications for Hong Kong's Residential Markets

At the initial stage of the current property cycle since the mid-1980s, residential property prices in Hong Kong were supported by strong end-user demand. Speculative activities only became more widespread in the early 1990s and at that period, sharp price rise was found in Hong Kong's residential markets, especially during the first half of 1994, prices increased by more than four folds since 1980s. Therefore, the increase in speculative activities in the residential property market following the spectacular rise in property prices has focused public attention which leads many to believe that speculative activities are the culprit of property price surge.

Owing to the situation faced in 1990s, the government, in early June 1994, announced an "action plan" which contains a number of measures to curb property speculation. The government has introduced medium to long term measures and the details of the measures are summarized in *Table 10.1*.

Table 10.1: Government's Anti-speculation Measures Introduced in June 1994

Area Covered	Details of the measures
Private Sales	1) Cut the quota for private sales of uncompleted flats from 50% to 10% to release up 10,000 more private domestic flats directly to home buyers each year; 2) Prohibit resale of uncompleted flats before assignment;
Period of Forward Sales	3) Restrict forward sales to not more than 9 months before the data of assignment;
Initial Deposit	4) Increase the initial deposit from 5% to 10% of purchase price; 5) Raise the amount of forfeiture from 3% to 5% of the purchase price, if the buyer fails to sign the Sales & Purchase Agreement or enters into a Cancellation Agreement with the developer;
Parking Spaces	6) Forward sale of car parking spaces will not be allowed, unless they are to be sold together with residential units covered by consent;
Coverage	7) Make development projects involving lease modifications and land exchange subject to building covenant restrictions, which specify completion dates, and to the Consent Scheme which governs the pre-sale of uncompleted flats;
Consumer Protection	8) Re-defined the date for completion of construction in the Sales & Purchase Agreement as the date of compliance with the lease conditions or consent to assign, whichever is earlier;

	9) Establish a statutory Authority to regulate the conduct of and prescribe the licensing requirements for estate agents;
Other Measures	10) Continue to study legislative measures to dampen speculation in the property market. These will include punitive stamp duty on short-term resale of property, penal rating on vacant premises, and the possibility of new legislation to replace the Consent Scheme and embrace the Law Reform Commission's proposals relating to sales descriptions of uncompleted residential property; 11) Establish and coordinate and information system by the Planning, Environmental and Lands Branch for monitoring speculative activities.

Source: Report of the Task Force on Land Supply & Property Prices, Planning, Environment & Lands Branch, Hong Kong Government

The purpose for the government to introduce the above anti-speculative measures is to curb speculation so as to control the dramatic rise in the property prices. It is because during that time, many think that the sharp increase in market price was mainly due to the speculative activities performed by the speculators. The market equilibrium price was claimed to be raised to a level which is not reflecting the actual affordability and demand of the general public. Therefore, the government determined to intervene the property market, which has the well-known reputation as being one of the most 'laissez faire' market economies in the world, at that particular moment by

introducing the anti-speculative measures in order to resolve this unhealthy rise of property prices.

The anti-speculative measures introduced in June 1994 obstruct the free operation of the property market have only achieved the government's immediate and short-term objectives of dampening speculation and depressing residential property prices, however, these measures are not effective in long-term. Subsequent property movements after 1994 also gave very strong support to the hypothesis that speculation is not a contributor to property price increase. The ineffectiveness of government intervention in long-term can be explained by the empirical results found in this study which provide concrete evidence that property prices lead speculative activities but speculative activities do not lead property prices and in the overall and mass private residential property sub-market and no lead-lag relationship is found between property prices and speculative activities in luxury private residential property sub-market by using the Granger causality tests. This implies speculation is not the culprit of property price surge in the long run. Therefore, suppressing speculative activities do not lead to the suppressing of property prices.

In fact, during 1990s, the whole economy in Hong Kong was under rapid booming and there were actually many long-term economic and demographic factors which contributed to the dramatic rise in the property prices. The dramatic rise in the property prices actually attributed to the slow recovery of the supply of the private residential properties, and rapid increase in the demand for residential property during that period. These strong demands of residential property can be shown by the persistent increase in population, as shown in *Table 10.2*, which indicated that the

demand from the public for better living has exceeded the supply available on the market.

Table 10.2: Population Growth between 1983 and 1995

Year	Natural increase ('000)	Net movement ('000)	Total Population ('000)	Population growth rate (%)
1983	56.8	1.1	57.9	1.1
1984	51.8	1.7	53.5	1.0
1985	50.9	18.6	69.5	1.3
1986	45.7	19.6	65.3	1.2
1987	43.0	6.6	49.6	0.9
1988	47.7	8.6	56.3	1.0
1989	40.9	14.0	54.9	1.0
1990	38.6	- 13.1	25.5	0.4
1991	39.9	23.4	63.3	1.1
1992	40.3	32.0	72.3	1.2
1993	39.9	70.5	110.4	1.9
1994	41.8	79.5	121.3	2.0
1995	37.2	113.5	150.7	2.5

Source: Hong Kong Census and Statistics Department

Ho (1999) suggests that residential property prices are dominated by fundamental factors such as population growth. The population growth argument is also supported by Wong (1993). During 1993, the net population movement increased

rapidly over time, increased from 23,400 in 1991 to 113,500 in 1995. The growth of the population is explained by the return migrants, as well as new arrivals hired by overseas and local companies. The net population inflow was a more important source of population growth than the natural increase of population. (Census and Statistics Department, 1997) This dramatic population growth created growing proportion of potential home buyers (Bank of East Asia, Ltd, 1996) which busted up the demand for residential properties. This exceed demand for residential property helps to explain why anti-speculative measures carried out by the government in mid-1994 so as to increase the cost of property transfer had short-lived effects. However, these anti-speculative measures were not a complete solution to the situation in long-term.

The results in the study should have policy important implications for policy makers of cities/counties such as Shanghai, Hangzhou, Beijing and Hong Kong, many of which experienced significant increase in residential prices over the last 18 months. Not only that anti-speculation cannot cool down the surging property price, in longer term, they are likely to lead to an increase in volatility due to increased transaction costs and decline the volume of transaction and market information. The government should not introduce anti-speculative measures to dampen property prices suddenly because these measures will impede the smooth functioning of the market which will affect the overall sentiment for the market prospects. According to Wong, Chau and Lai (1996), attempts to smooth these fluctuations through government interventions would only result in a less efficient property market and lead to higher prices.

The government should introduce indirect measures which can control the demand and supply of private residential property in order to control property prices

in the long-term. The most effective measure is to increase the supply of land for property development, and in turn, of private residential property, at a steady supply of residential property to meet the rising demand will help to slowdown the growth of property prices.

However, owing to the geographic limitations in Hong Kong, increasing land supply is not an easy task. Hong Kong is a small place; with total area of only 1102.56 square kilometres and 84% of the land is too hilly for property development. Moreover, the supply of new land is also controlled by the leasehold tenure system in Hong Kong. The Sino-British Joint Declaration stipulated that the total amount of land granted is limited to 50 hectares per year during the transition period.

Although an annual aggregate land sales limit of 50 hectares is specified in the Joint Declaration, the Land Commission has indicated clearly that the amount of land to be sold each year is subjected to negotiation and will be determined with due regard to the genuine need for land for various purposes.

Moreover, in spite of the restriction of the new land supply, there are some relevant measures to increase land supply should be considered. As suggested by Ho (1998), these measures include speeding up redevelopment, opening up new residential areas, rezoning, simplifying planning procedures and improving transport infrastructure. And Barlow (1993) claime that the supply of land in the long run is not fixed because land can be converted from alternative uses. For instance, land supply can be increased by freeing up some of the idle or underused industrial land for residential uses (Tse, 1998). This change of land use is viewed as redevelopment,

which is a significant source of land. Moreover, speeding up redevelopment process is also very important to increase land supply; this can be done by introducing some measures which can shorten the processing time involve in the redevelopment project. In addition, increasing the density in the urban areas by allowing high plot ratio, or free up more land for residential development by re-zoning are some alternatives to tackle the above problems.

Chapter 11 Conclusion

11.1 Summary of the Study

This dissertation examined the lead-lag relationship between property prices and speculative activities in overall, mass and luxury private residential property markets in Hong Kong. The empirical results confirm that during the time period between 1993 and 2004, property prices lead speculative activities in overall and mass private residential property markets but not the vice versa. For the luxury private residential property market, no lead-lag relationship is found between property prices and speculative activities.

Therefore, it is not correct to blame speculative activities for the property price surge whereas the underlying cause for speculative activities is the price movement. Speculators who voluntarily expose themselves to the risk of price change should not be blamed for the increasing property price. Speculation is only a price-searching activity, which helps to establish the best possible price in the property market. And from an economic point of view, speculative activities should not be curbed as speculation is economically desirable in spreading risk.

Moreover, these findings have important policy implications for the Government of the Hong Kong Special Administrative Region (HKSAR). It is not wise for the government to introduce different anti-speculative measures in the early 1990s in order to dampen the property prices surge. These measures intervened the free property market in Hong Kong and were only useful to control the increase in the

property price in the short run. However, these anti-speculative measures to curb sharp rises in property prices were ineffective in the long run given the direction of causality between property prices and speculative activities. These measures certainly led severer fluctuation in property prices in the long run since these measures impeded the smooth functioning of the market and resulted in a less efficient property market according to Wong, Chau and Lai (1996). The true underlying reason for the surge of property prices is because of the disequilibrium of supply and demand of private residential properties in Hong Kong, i.e. the supply of private residential properties fail to meet the increasing demand of private residential properties. As a result, in order to control property prices surge due to the disequilibrium of supply and demand of private residential properties in Hong Kong, the government should introduce measures which can control the supply and demand of property in the long run. The most effective measures are to increase the land supply, speeding up redevelopment, opening up more new residential areas, rezoning, simplifying the planning procedures and improving the transportation infrastructure as suggested by Ho (1998), Barlow (1993) and Tse (1998).

11.2 Limitations of the Study

In this study, a long run lead-lag relationship between property prices and speculative activities Hong Kong's residential markets is investigated. Therefore, it is preferable to have a large number of observations in order to have a more accurate result. In this study, the period studied is between January 1993 and September 2004. The time span chosen is not long enough to provide a confident result. A more confident result will be provided if twenty years is used as the study time period.

Secondly, it is the reliability of the data used in this study. The number of confirmor transactions and the total number of sale and purchase agreement is obtained through the Economic Property Price Centre (EPRC). However, the reliability of the data found in the EPRC is questionable. Since EPRC is a private database system which collects the registered transactions from the Land Registry and transfers to the EPRC, there may be bias in transferring the data. It will be more accurate to use the data released from the Land Registry directly as it accurately recorded the different types of transactions. However, the data for the number of confirmor transactions and the data for total number of sale and purchase agreement prior 1996 are not provided by the Land registry. Therefore, the data from EPRC instead of the Land registry is adopted in this study so as to provide a consistency and longer time series data.

In view of these problems, the underlying lead-lag relationship between property prices and speculative activities may not be fully revealed.

11.3 Suggestion for Further Research

Apart from dividing the entire private residential property market into mass and luxury sub-markets in order to have a thorough investigation of the lead-lag relationship between property prices and speculative activities. Further research can be done to investigate the lead-lag relationship between property prices and speculative activities in the first hand and the second hand private residential property sub-markets. As in Hong Kong, quite a large proportion of speculative activities are

concentrated in the pre-sale market. And there are more favourable financial packages provided by the developers in first hand private residential property market. Therefore, this may have different results of lead-lag relationship between property prices and speculative activities as in overall private residential property market and so it is worth to have further investigation.

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